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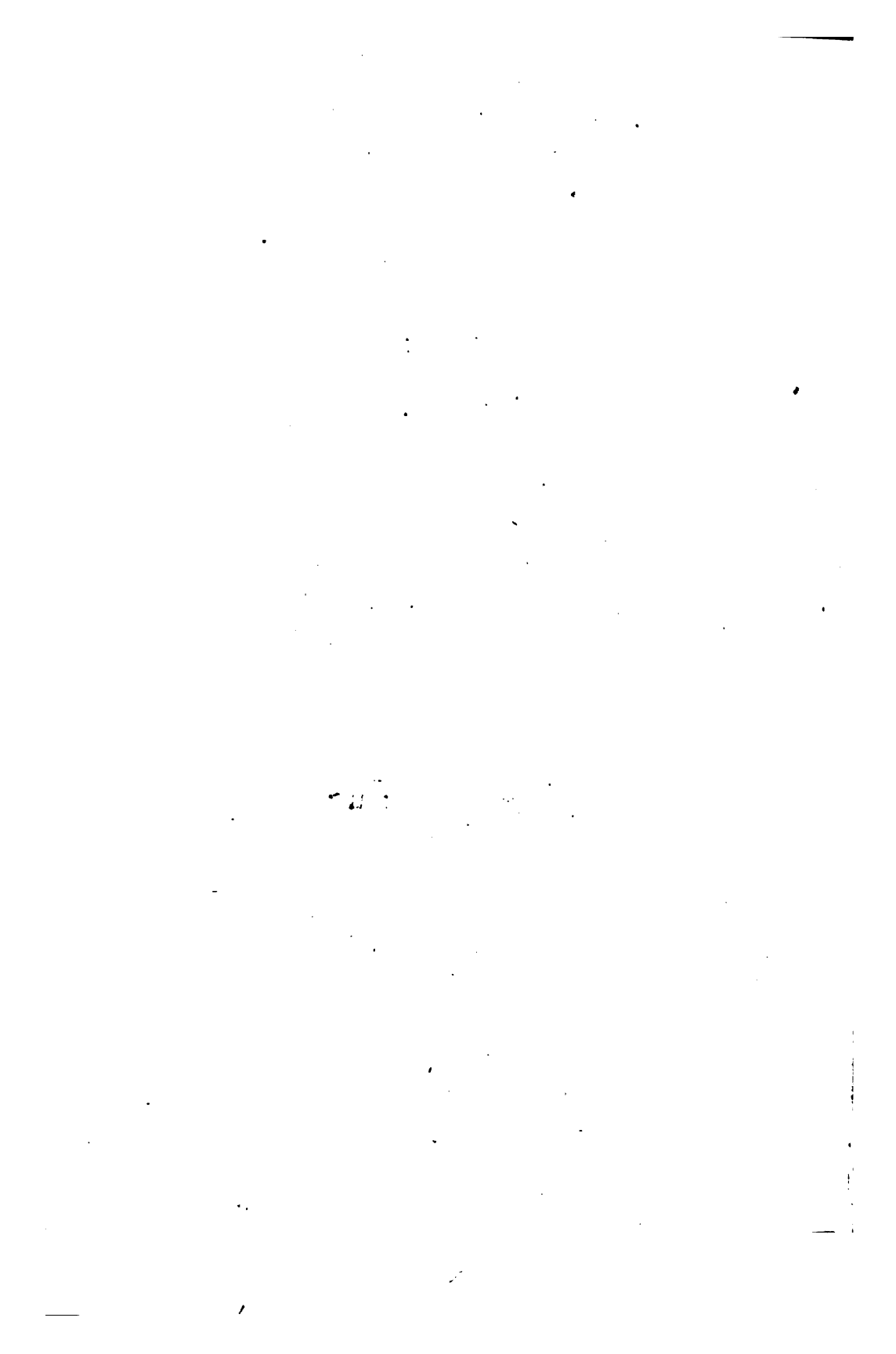
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JOURNAL
OF THE
**American Veterinary Medical
Association**

FORMERLY
AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n)

EDITED AND PUBLISHED FOR

The American Veterinary Medical Association

BY

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NEW SERIES VOLUME II

ITHACA, N. Y.

Published by the American Veterinary Medical Association

1916

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JOURNAL

OF THE

American Veterinary Medical Association

Formerly American Veterinary Review

(Original Official Organ U. S. Vet. Med. Assn.)

PIERRE A. FISH, Editor

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VOL. XLIX. N. S. VOL. II.

APRIL, 1916.

No. 1.

Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary C. M. Haring, University of California, Berkeley, California. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

WHY JOIN THE A. V. M. A.?

We have occasionally received letters relative to joining the A. V. M. A. Exceptionally the question is hinted at on a commercial basis: what is there in it for us in return for our initiation fees and annual dues? What of value is there in membership in any fraternal, religious or insurance organization where expenditure is involved? The underlying principle is the same in these as in a professional organization—an interest in something outside of one's self, an interest in one's profession and fellow man.

We may conceive, however, that there are some people who would prefer to buy a book of sermons and read them rather than go to church and bear their share of its support. This would impose a tax on the religious spirit. A tax would be imposed upon the dramatic spirit if some preferred to procure a copy of the play to read rather than to see it performed at the theater. A tax would similarly be imposed upon the professional spirit if any number of the members preferred merely to read the printed transactions of the organization's activities rather than to take part in them.

Money is essential in the support of any organization, but it is not the only essential. Above money is purpose, high ideals, and

a desire for the betterment of conditions that can be improved. The financial factor is necessary in carrying them out but it ought not to obscure them.

In working for the advancement of common interests no organization has probably made extensive progress, without at some time or other along its course, having made blunders of a more or less serious nature. Not to have done so would have required super-human qualities. To err is human; to emphasize the blunders and forget the worthy motive which inspired the effort retards rather than promotes progress.

We believe that the majority of the veterinary profession of this country has high ideals. We believe that, aside from his own personal activities, the progressive veterinarian has an interest in his profession and desires that it shall attain as high a rank in the minds of the public as any other profession; that commercialism does not overshadow his ideals; that he is not imbued with the idea that he lives for himself alone but is ready and willing to contribute to the good of others; that greater and more substantial gains can be made toward these ideals by working in mass formation than as isolated individuals.

P. A. F.

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THE MAN BEHIND THE GUN

The past two years have been epoch making in the history of the veterinary profession in the United States. During this time the profession has grappled with, and successfully combated, in spite of the opposition of ignorance, one of the great animal plagues of the world.

There are relatively few outside of the veterinary profession who realize what the eradication of this plague means to the livestock industry of America, and the welfare of the people. In dealing with such a plague as this, it is natural and proper that the Bureau of Animal Industry, and the state veterinary authorities should receive a good deal of publicity, and much credit for the excellent results accomplished. A great deal of credit is also due the profession as a whole.

We want to commend the splendid stand taken by veterinarians in private practice who have been true to their duty to our profession. In those regions where f

prevailed the sacrifices made by the private practitioners have been great—they have given their services freely; they have been compelled to neglect their practice, and in a number of instances their practice has been ruined because of the efforts they have made, not only to assist the authorities, but by their own individual efforts to stamp out the disease. Some day in the not distant future, when the stockmen realize what the veterinarian has done for them, those who have been loudest in their condemnation will rise up and call the veterinarian blessed.

We believe that both the federal and state authorities appreciate the cordial support given them by the profession as a whole. It is a credit to the profession that only a very few veterinarians have crucified their ideals for a few pieces of silver, the ninety and nine have been loyal in the great battle. It is to this every-day practicing veterinarian "bumping the country roads", who has had no champion in the public press, that we wish to pay a feeble, but just tribute for the service he has so freely and efficiently given in this crisis, and for the professional ideals he has upheld.

N. S. M.

THE JOURNAL FOR THE PROFESSION

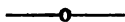
Not long ago a prominent veterinarian asked us seriously if it was planned to publish anything in the *Journal* besides the material pertaining to the American Veterinary Medical Association. The thought has occurred to us that if one so prominent might take this view of the situation there might be others. In our first editorial in the November number we stated "there must be space for contributions if the periodical is to be a *Journal* in fact as well as name", and that we wished to "have a sufficient variety of articles of timely interest to appeal to the progressive practitioner, who, after all, is the bulwark of the profession"; and again that "for community of interest there must be due consideration for the ordinary and every day affairs of the practitioners".

We reiterate this position regarding the A. V. M. A., and in it for the best or not. We wish of the profession reach them too and out process cannot

be confined to the efforts of any one individual, it needs the co-operation of many and especially those on the firing line. There are, perhaps, various methods of cooperation but that which appears to us most effective is for each veterinarian to feel a partial responsibility and ownership of the *Journal* and contribute to it case reports or some of the experiences which have been of interest in a clinical or practical way and which will therefore probably interest other practitioners.

The association is not for itself alone, it is for the profession and the *Journal* as its official organ must of necessity be for the profession also. If erroneous ideas have been or are held on this subject we trust that each reader will do his share in dissipating them.

P. A. F.



VETERINARY SERVICE IN THE ARMY

If the present legislation increases the Cavalry and Field Artillery there will be needed two veterinarians for each new regiment of Cavalry and Artillery. Veterinarians who wish to enter this regimental service will have to pass an examination in the regular subjects taught in veterinary colleges and high schools, and in equitation. Antecedents and moral character will have to be excellent.

Also, if the present Army Veterinary Bill passes both Houses, it is proposed that another bill be enacted to form a Veterinary Reserve Corps on the same lines as the Medical Reserve Corps which accepts medical men who pass a prescribed examination and who are then subject for duty whenever called upon. Immediately they are put on duty they assume the position of an army officer in the Medical Corps and receive the rank, pay and allowances to which they are entitled.

Failing the passage of the Army Veterinary Bill it is proposed that a committee of members of the American Veterinary Medical Association be formed for the purpose of collecting the names of veterinarians who offer to serve in case of war. The duties would be inspecting meat, hay, grain, horses, mules, and regular veterinary work at hospitals located at base and mobile depots behind and along the battle lines.

It is advised that only members of the A.V.M.A. will be accepted by the War Department, because it will give the preference to men

who belong to a credited and recognized organization that is in a position to vouch for each veterinarian accepted as a member.

Army veterinarians at present receive the pay and allowances of a Second Lieutenant of Cavalry, viz: \$1700 per year with house, light, fuel and \$150.00 per year if he buys a horse suitable for an officer's charger and \$50.00 more if he buys another horse, making \$200.00 per year for two horses. Every five years, up to 20 years, he gets an increase of 10 per cent of his pay.

He and his family receive free medical and dental services.

Veterinarians who wish to join the new regiments of Cavalry and Field Artillery that may be formed in the coming Army legislation, should send in their applications to the QUARTERMASTER GENERAL, U. S. ARMY, WASHINGTON, D. C., stating their special qualifications, etc.

Veterinarians who wish to enter the Veterinary Reserve Corps, should join the American Veterinary Medical Association, if they are not already members, as soon as possible. Then every member who desires can fill out a blank similar to the following and send it to Dr. R. VANS AGNEW, Fort Leavenworth, Kans.:

.....
1916
 Street.....
 Town..... State.....
 Married or single..... Age.....
 Preference of duties.....
 Knowledge of riding (good, poor, no).....
 Are you a member of the A. V. M. A.?.....
 Will you serve in the veterinary department in case of war?.....

 (Name)
 —o— R. V. A.

EUROPEAN CHRONICLES

Bois Jerome.

SWINE TUBERCULOSIS. The importance this affection has in relation to meat inspection is sufficient to explain the interest that it has promoted in many countries, where the trade or the consumption of swine is extensive. For this reason perhaps, from many foreign countries valuable communications have been produced although the literature on the subject may not be very fully sup-

plied, yet one can read interesting articles from the pen of Belgian, French, and German writers without neglecting those also from American investigators such as Mohler, Washburn, Moore, Dawson and others.

Mr. Chaussé, a French veterinarian, a great investigator of the subject of tuberculosis, has recently published in the *Annales de Pasteur Institute* (November and December, 1915) a long article on "Swine Tuberculosis and Comparative Pathology and Evolution," which is illustrated by a number of plates corresponding to the various parts under consideration.

In the first part the author presents the history of this affection as far as it has been observed and as cases have been recorded. Ostertag, Nocard, Moule, Volkel, Stubbs, Moore, Dawson and many others are receiving due credit for their observations, their opinions are discussed, and references are given to their publications.

Statistics are presented relating to the morbidity of tuberculosis among cattle and swine. In one table, the French abattoirs furnish the material for comparison with steers, bulls, cows, calves and pigs. In another, the proportion of meat condemned. In a third, other countries of Europe furnish the statistics: Belgium, Prussia, Germany, Luxemburg, Holland, Italy. From this recapitulation and comparison the author, who treats of his subject essentially because of investigating the disease comparatively in France, says in conclusion: this contagious affection prevails with less intensity in that country among both cattle and pigs, that tuberculosis is always more frequent in cows, that of calves being from 30 to 100 times rarer, and that swine hold a medium position, the disease being from 4 to 20 times less frequent than in cows.

The problem of the channels of entrance for infection in swine tuberculosis is considered under five chapters: 1—entrance through the tonsils and cervical lymphatics, 2—by the intestines through the chyloferous vessels and the thoracic duct, 3—by the direct air passages or inhalation, 4—through the genital tract by castration. A fifth is also considered by the association of the first two, which is called the mixed channel.

Of these various tracts of entrance, the first and the fourth receive greater attention. For the first, already known to all veterinary meat inspectors by the cervical caseous glands, the author considers the condition of the maxillary, parotid, and retro-pharyngeal glands, giving and illustrating their aspects as well as their

characters according to their age. And then the lesions of the tonsils, the starting point of the process as pointed out by Strose in 1897, Mendoza in 1906, Mohler and Washburn in 1908. It is true that the tonsil lesions cannot always be detected, unless looked for by microscopic examination and then it may be necessary to make them most minutely.

These lesions are then described and illustrated by quite a number of microphotographs showing sub-tonsil and intra-tonsil tubercle.

“The lesions of the tonsils have an important pathogenic significance, they are the first step of the infection although not the most visible. The second step being that of generalization.”

The knowledge of this generalization is the basis of inspection in swine or bovine tuberculosis. In the former it is easier to define and recognize than in the second.

Chaussé then gives the characters of the recent, beginning and very slight generalization. One where the infection has taken place about 30 or 40 days before. After 50 or 60 days the generalization is at the second degree, the third being generally detectable after about 3 or 4 months, and then is followed by a fourth degree corresponding to the initial bacillema dating six months or more or to some repeated, more recent and varying in number, and in which lesions can be found in almost all parts of the animal.

After alluding to the intestinal entrance, to the tonsil and intestinal, to direct infection by the air passages, the author arrives at the fifth or the entrance through the genitals or by castration.

It is mentioned by the Germans, but seems to be unobserved in France. It is recognized by its seat, the testicular region, where there are marked lesions with characters older than those of the viscera.

There are subcutaneous tubercles at or in the tissues of cicatrization, hard, small, caseo-calcareous. The surrounding lymphatic glands are involved. In that form of tuberculosis, the cervical and mesenteric glands are not tuberculized, but the inguinal and iliac are. In the generalization of tuberculosis by castration, the lesions are much the same as those of cervical origin.

This long consideration relating to the lesions is followed by their histological study and principally those of the lungs, when the entire subject is brought to an end by a general comparison between swine tuberculosis and that of other species, especially from the point of view of the pathology and following conclusions.

Knowing the histological differences of the pulmonary lesions existing between swine and bovine tuberculosis and also those of the maxillary lymphatic glands, there are interesting peculiarities to observe.

The lung, liver and spleen characterize swine tuberculosis the best, and this simultaneously as soon as the infection is somewhat severe.

In swine, the tuberculous virus has very little affinity for the kidneys and renal lesions are very rare.

Yet with swine, the receptivity of the organism for the virus seems to be the greatest, no encysted lesions are found as there are in man or bovines.

Generalization is in swine, the rule, at the most a few months is required after the infection.

Peripheral glandular lesions and tubercles of the bones are peculiarly frequent in swine, if they lived long enough. Then most of them would be affected with extensive lesions of the vertebral column.

With swine there is no retrogression with the tubercle, no fibrous transformation: it seems as if with them the disease process always progresses. In general caseination always takes place early.

In swine all the tissues are good for cultures of the virus, more than in other animals, with the exception, however, of the kidneys. They represent an organism which does not create occult lesions with bacilli having a normal virulency.

Properly speaking, swine are not infected through the digestive canal, the entrance of the virus takes place most often through the tonsils and very likely the inoculation is the result of traumatism.

Finally let us notice how tuberculous conditions, no matter what the channel of entrance, are much alike in their various steps of development. Indeed tuberculosis by bucco-pharyngeal entrance as in swine is pathologically identical with primitive intestinal tuberculosis. The latter does not probably ever penetrate by Peyer's patches and the closed follicles which are the true intestinal tonsils.

For us, says Chaussé, the same passive etiological condition exists in the pharynx and in the intestines; the cause of which is the accidental presence of the bacillus in the lymphatic follicles.

In résumé: swine tuberculosis is the type of tuberculosis of bucco-pharyngeal origin as comparatively human and bovine are generally types of tuberculosis by inhalation.

INTRA-PALPEBRAL MALLEIN TEST. Inaugurated in Italy, where Prof. Lanfranchi applied it first, this method to diagnose glanders has traveled all over the world. French, German, Italian and American veterinarians and observers have experimented with it and have shown whatever weak points there were in it, if it had any, and have recorded the good results that have been obtained. Thousands of animals have been submitted to its effects; many have been confirmed as glanderous and condemned as such by it and their post-mortems established and proved the correctness of the verdict rendered. Large areas have been cleared of the disease and healthy and sound horses saved from the terrible contagion and to-day in the *Journal of Comparative Pathology and Therapeutics* for December, 1915, Captain Goodall of the South African Veterinary Corps gives a long, magnificent record of the task which he had to carry out when called to solve the problem of finding glandered horses among those suffering from septic pneumonia, strangles, catarrh, etc., whose temperatures were most irregular and which could not be tested by the ordinary subcutaneous method.

First, the captain resorted to the method by instillation of undiluted mallein in the conjunctiva and he obtained fairly good results, but as there were many drawbacks to its use, he fell back on the intrapalpebral test, modifying slightly the original method in the preparation of the mallein and injecting only one-fifth of the concentrated mallein as a dose.

The technic of the operation is described and is about the same as usual, the characters of the ocular reaction are given and illustrated and the classification is offered of the local reactions according to their degree of intensity.

For instance, for *positive reactions* (XXX) (a) indicates as symptoms, intense swelling of the eyelid, infiltration of the surrounding subcutaneous tissue, with complete or almost complete closing of the eye and a copious discharge of muco-purulent material from the inner canthus, accompanied with marked conjunctivitis.

(XX) (b) means as reaction, a marked swelling of the eyelid, extending to the cheek, discharge of muco-purulent material, but only **partial** occlusion of the eye. Marked conjunctivitis.

(X) (c) indicates the presence of swollen eyelid persisting for forty-eight hours, with discharge of muco-purulent material but only **slight**, if any swelling of the surrounding tissue. Marked conjunctivitis.

Doubtful reaction:(?) (d). Swelling of the eyelid persisting for forty-eight hours, with no other symptoms and no discharge of muco-purulent material or any collection of it in the canthus.

Negative reaction:(e). No swelling of the eyelid after forty-eight hours and no muco-purulent discharge.

It is with this classification that after a few remarks on the characters of the swelling, of the muco-purulent discharge and its microscopic examination, of its post-mortem appearances and duration, that Captain Goodall gives a condensed résumé of the results obtained from a number of horses tested and condemned by the intrapalpebral method.

This record is very interesting, the subjects having been collected into five groups, each presenting a specific condition.

In group No. 1, the *clinical cases* were gathered. Six animals tested. Five gave positive reactions. One was negative.

Group No. 2. On *animals which had previously given a thermal and local reaction to the subcutaneous mallein test*. Seven animals. All gave positive reactions.

In group No. 3 were the *animals that had given a previous doubtful reaction to the subcutaneous test*. Seven animals operated upon. Six were positive. One doubtful had, at post-mortem, one well defined lesion the size of a pea, in the lung.

Again in group No. 4 were animals which had given a *doubtful reaction to the subcutaneous test*. Four positive results out of four subjects tested.

Group No. 5. *Animals which had failed to react to the subcutaneous method*. Nine records are given. Eight gave positive reactions. One was doubtful but developed clinical glanders fourteen days later.

In group No. 6 were considered *animals which had not been previously tested by any other method*. Twelve horses were condemned by positive reaction.

In group No. 7, seven horses which had been tested by the subcutaneous method and had given reactions and were tested with the palpebral method. Three gave positive results. Four were negative.

In group No. 8 were presented animals tested *simultaneously by subcutaneous and intra-palpebral methods*. Seven tested, seven positive.

Group No. 9. Three horses which had *reacted to the intra-palpebral test were 24, 48, and 72 hours after reinjected* in the other eye. They all gave another reaction twenty-four hours after a previous injection.

The presentation of each of these groups is closed with remarks and conclusions referring to each and form a basis for the general conclusions summarized as follows: "The intra-palpebral test is a safe and reliable method to use in the diagnosis of glanders and its certain advantages distinct over the classical subcutaneous method are briefly summarized below:

1. Clinical cases give constant reaction with this method.
2. Animals which have given double reactions with the subcutaneous method react with the palpebral even during the height of the subcutaneous temperature curve.
3. Doubtful reaction to the subcutaneous test can be retested by this method and give reaction immediately afterwards.
4. Certain animals which have failed to react to the subcutaneous test react to this method.
5. Animals which could not be tested by the subcutaneous method, on account of other disease and high temperature, can be tested by this method and react as glanders.
6. A safe diagnosis can be made on the local reaction alone, which cannot be done with the subcutaneous method.
7. The local reaction is more delicate than the subcutaneous one and more easily interpreted. Doubtful local reactions are extremely rare.
8. In ordinary cases, one can obtain temperature, local and ophthalmic reactions by one injection.
9. Mules react to this test as horses, (which has not been the case in the experience of the author with the subcutaneous method.)"

These conclusions end by statistics which speak for themselves on the value of the method which is the object of this good publication: "Over 1400 animals have now been tested by the intrapalpebral method as described and so far no failures can be recorded."

A. LIAUTARD.

EFFECTS OF FEEDING COTTON SEED AND ITS PRODUCTS TO SWINE*

G. A. ROBERTS

North Carolina Experiment Station, West Raleigh, N. C.

This paper is not intended to be a complete treatise upon the subject of feeding cotton seed or cottonseed meal to swine, but rather a digest of the work and conclusions of the North Carolina Experiment Station during the past six years of investigation, by the animal husbandry, the chemical and veterinary divisions of the station.

Cotton seed, at one time considered a worthless by-product, has become a most valuable product, not only in the South but in many parts of the world. Its use as a rich source of protein for feeding animals has been recognized for a number of years. It has also been known for some time that the feeding of cottonseed meal to swine for more than a few weeks at a time often resulted in the death of the swine. Other animals, especially calves, sometimes show ill effects from it.

The interest and importance of this subject may be judged from the large number of stations and individuals carrying on experiments along this line during the past twenty-five years. With the hopes of determining the exact cause for the ill results, the change in the body tissues and a remedy for same, this station undertook to do so through its animal husbandry, chemical and pathological divisions.

The animal husbandry division provided the animals, the quarters, the unprepared feeds, and did the feeding except where forced feeding and intraperitoneal injections were made.

Some twenty (20) calves were furnished, two hundred eleven (211) swine, five or six hundred (500-600) guinea pigs and a like number of rabbits (Belgian hares). Both of the latter are very susceptible to cottonseed meal poisoning, death occurring in from six to twenty-two days feeding, average of thirteen days in these animals. These smaller animals were used for the preliminary feeding for economy of time and animals. The earliest death we had in swine was thirty days, one was discontinued after two hundred

*Presented at the meeting of the A. V. M. A., Section on Practice, Oakland, Cal., September, 1915.

and twenty-six days, but usually death occurred in from fifty to eighty days. Three calves died in from seventy-one to two hundred and eighty days.

The poultry division also fed some cottonseed meal and its products to fowls with fatal results.

The chemical division prepared the modified cotton seed and cottonseed meal to be fed and made the necessary chemical analysis. In all, this division prepared three hundred and thirty-five feeds, most of which differed in quality or quantity, though a few were duplicates—as when the same feed was fed to different classes of animals.

Among the various feeds prepared may be mentioned the following: lint, hulls, oil, decorticated kernels and meal (new, old, cooked, fermented naturally and by yeast, and digested with pepsin and pancreatin.) Extracts were made with water cold and hot, lime water, acetic, hydrochloric, and sulphuric acids; watery solutions of sodium chloride, ammonium citrate and potassium hydroxide; ether, chloroform, alcohol, etc. In an attempt to find an antidote, iron salts, ashes, lime, etc. were added to the meal.

The interesting factors determined by these feeds show conclusively that the substance of gossypol is very toxic and that iron salts, ashes, etc., act as partial antidotes.

Gossypol (gossypium-phenol) is found generally distributed throughout the cotton plant, even in the roots, but conspicuously in the seed. Here it is confined to little yellowish brown to black specks readily observed on cross-section of a kernel, especially with a hand lens. It is largely responsible for the yellow color of the meal.

The chemical division found that this substance was much more readily obtained from the decorticated seed than the meal. While several solvents were available their method of securing it was to remove the oil from ground up kernels with petroleum ether then extract again with ethyl ether. After evaporation a red resinous material of peculiar pungent odor amounting to about 2.5% of the weight of kernels was obtained. This consisted of about one-half gossypol, estimated, and other undetermined substances. Further extraction with alcohol, following the ether, left a residue practically free from gossypol which was fed to rabbits six to eight times longer than average fatal periods without ill effects. Oxydized gossypol in filtrate obtained by boiling cottonseed meal with alcoholic caustic soda apparently is also non-toxic.

In comparing the efficiency of various antidotes sulphate of iron, ashes, etc., though not lime, enabled swine to feed much longer on cottonseed meal than without such. Cottonseed meal was fed from one-fourth to three pounds daily per one hundred pounds live weight, and the iron sulphate was added to it from one-fourth to one ounce per day. These agents did not always prove effective in preventing death but prolonged the period of safe feeding cottonseed meal greatly and in many cases appeared to be specifics.

The veterinary or pathological division undertook to make a close study of the clinical symptoms and the gross and microscopical lesions.

Some clinical or daily observations were made of nearly all the animals before mentioned.

Autopsies were conducted upon three calves, one hundred and sixty swine, including eighteen slaughter observations on swine receiving corrective agents (antidotes), some five hundred or more guinea pigs and a like number of rabbits.

It should be noted here that as in many other diseases the symptoms and lesions are not always characteristic; in some cases they were too slight to be noted and in others were marked clinical symptoms and gross lesions; some cases very acute and some very chronic.

CLINICAL OBSERVATIONS: Observations upon the living animals consisting in noting all evident symptoms of disease; on a number of swine the daily recording of pulse, temperature and respiration, and weekly examinations of blood.

General symptoms of cottonseed meal feeding: Among the more common symptoms in swine fed on cottonseed meal were noted: rather firm feces, though diarrhoea was occasionally present; rough, coarse hair, indicating unthriftiness, in chronic cases; irregularity or loss of appetite, especially for the cottonseed meal, weakness, lying down a great deal, unsteady gait, more or less blindness and in chronic cases, difficult jerky breathing, more pronounced in acute cases. Animals would finally get down unable to rise and would lie there either in a comatose condition or in a constant effort to regain their feet, often grunting as if in much pain. A few cases frothed violently at nose and mouth just preceding death. Death would follow in a few hours to several days. Many animals, however, that appeared hale and hearty at the evening meal were found dead the following morning. In two cases ap-

parently healthy hogs died suddenly when driven on scales to be weighed.

In rabbits and guinea pigs, the most conspicuous symptoms consisted of rapid breathing, lassitude, prostration, and death in a few hours.

TEMPERATURE, PULSE AND RESPIRATION: Swine are not very suitable animals for obtaining satisfactory records of temperature, pulse and respiration. In these observations, made upon some half dozen swine, the changes and irregularities were as great in the checks as in those fed cottonseed meal, to within a short time before death. A rapid, weak and often imperceptible pulse and difficult breathing were noted prior to death in a number of cases.

BLOOD EXAMINATIONS: Weekly blood examinations were made of a dozen or more swine and of several guinea pigs. The object was to determine the per cent of solids in the blood from week to week, the number of red and white corpuscles, per cent of hemoglobin and the differential leucocytic count. While some variations occurred in several instances, the variations in the check animals were about as well marked as in those feeding upon cottonseed meal. In some cases showing a chronic affection, with emaciation, there was a slight decrease in the hemoglobin but in no case was this a marked characteristic.

AUTOPSY EXAMINATIONS: The post-mortem examinations consisted in looking for all the gross lesions observable, making histological studies of various tissues and noting the weights of the principal internal organs.

GROSS LESIONS IN SWINE: Among the more common necropsy observations were found an excess of pleural and abdominal serous fluids, congestion, inflammation and edema of lungs, thrombi in heart, some congestion of heart, of liver, of kidneys, of stomach, of intestines and of lymph nodes,—congestion of internal organs in general, as noted by injected blood vessels. An excess of sand and gravel was found in the stomach and intestines, indicating a depraved appetite.

In rabbits and guinea pigs excess of abdominal fluid and congestion of abdominal organs were found more frequently and thrombi, edema of lungs and excess of pleural fluid were found less frequently than in swine.

In fifty necropsies upon swine the frequency of lesions were as follows:

Thrombi in heart.....	83%
Edema of lungs.....	84%
Excess pleural fluid.....	70%
Congestion of lymph nodes.....	66%
Excess abdominal fluid.....	46%

It is interesting to note that ante-mortem clots (thrombi) were not found upon autopsy in any of the nine hogs which received iron salts along with cottonseed meal.

The most frequent apparent cause for death in swine was edema of the lungs with which thrombi of the heart were often associated. In some cases, however, with edema present, no thrombus could be found. In other cases with marked thrombi no edema was found.

In fifty necropsies upon rabbits the following frequency of lesions was found:

Thrombi	52%
Edema of lungs.....	20%
Excess pleural fluid.....	28%
Excess abdominal fluid.....	72%

In necropsies on one hundred guinea pigs the following frequency of lesions was found:

Thrombi	18%
Edema of lungs.....	41%
Excess pleural fluid.....	18%
Excess abdominal fluid.....	64%

HISTOLOGICAL EXAMINATION OF TISSUES: Forty-two histological studies were made of tissues from swine as follows: six heart muscle, four aortae, seven lungs, seven livers, nine spleens, and nine kidneys. Eighteen sections consisting of seven spleens, all four aortae, three heart muscles, three lungs and one liver showed no microscopical lesions.

Among the twenty-four sections showing microscopical lesions, the following was observed:

Hyperaemia—Kidneys 66-2/3%, livers 86%.

Inflammation—Lungs 57%, kidneys 22%, heart muscle 16-2/3%.

Hemorrhage—Livers 57%, kidneys 22%, heart muscle 16-2/3%.

WEIGHTS OF INTERNAL ORGANS OF SWINE: Weights of internal organs were made and compared with the total weight of hog. In most cases there was some congestion of the internal organs and the relative weights were usually somewhat high, though varying within rather wide limits,

Of thirteen hogs the limits were as follows:

Livers varied from 1.87% to 4.50% of total weight

Spleens varied from 0.07% to 0.20% of total weight

Kidneys varied from . 0.28% to 0.80% of total weight

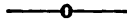
Hearts varied from . . 0.38% to 0.81% of total weight

Lungs varied from . . . 0.99% to 3.33% of total weight

CONCLUSIONS: While several agents before mentioned have proven efficient in prolonging the period of safe feeding of cottonseed meal no practical means for eliminating the toxic element, or elements, has as yet been developed.

The writer believes the effect of the above agents are purely chemical in rendering the gossypol, and possibly other toxic substances, non-toxic. He has noted with others that hogs having range and rooting a great deal, apparently gain minerals from the soil and forage which enables them to withstand the cottonseed meal longer than when confined, especially when on a board floor.

Since iron salts did not prevent all deaths and that a number of iron fed swine developed conspicuous rheumatic symptoms, the writer does not believe iron to be the logical antidote, but has hopes that a safe method of feeding the meal to swine will be discovered.



THE BACILLUS ENTERITIDIS AS THE CAUSE OF INFECTIOUS DIARRHEA IN CALVES*

K. F. MEYER, J. TRAUM AND C. L. ROADHOUSE, Berkeley, California.

INTRODUCTION.

- I. Plan of Feeding Experiment.
- II. Course of the epidemic.
 - a. Discussion of the Clinical Symptoms.
 - b. Discussion of the Pathological Anatomy.
 - c. Discussion of the Bacteriologic Findings.
- III. Calf Feeding Experiments with Isolated Culture.
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*From the Laboratories of the University of California. Presented at the meeting of the A. V. M. A., Section on Sanitary Science and Police, Oakland, Cal., September, 1915.

In the course of a feeding experiment on calves at the Agricultural Experiment Station of the University of California (under direction of C. L. R.), infectious diarrhea or scours in a severe form made its appearance. The writers were able to determine the etiology of this outbreak and to prove that the *B. paracolon* or *B. enteritidis* (Gärtner)¹ is also responsible for infectious diarrhea of calves in the United States. In view of the fact that scours has not been extensively studied in this country, we report today our findings.

I. THE PLAN OF THE FEEDING EXPERIMENT. The object of the feeding experiment was to determine what influences the feeding of alfalfa hay or grain had upon the health of young calves.

The procedure in this experiment was to allow the calves to run with their dams for four days; then to receive whole milk until ten days old, after which period there followed a reduction of whole milk at the rate of one pound per day and the addition of a like amount of skim milk until the calves were receiving all skim milk. In addition the lots were handled in separate pens as follows:

Lot I, consisting of four calves (Nos. 1220, 1222, 1228 and 1239), which received, beginning with the fifth day, alfalfa hay until thirty days old.

Lot II, consisting of five calves (Nos. 1241, 100, 1240, 1236 and 1237) which received, beginning with the fifth day, grain and alfalfa hay until thirty days old.

Lot III, consisting of five calves (Nos. 1215, 1216, 1217, 1218 and 1219) which received, beginning with the fifth day, grain until they were thirty days old.

The grain fed to Lots II and III consisted of rolled barley, three parts, whole oats, two parts, and bran, one part, by weight.

Lot IV-a consisted of five calves (1201, 1207, 1210, 1211 and 1213).

(1) The paratyphoid-enteritidis group of intestinal organisms can be separated serologically into two large groups (I and II.). Recent investigations have shown that the representatives of these groups can be further classified on account of their specific pathogenicity for man and animals. Various subgroups have been suggested, but in this paper the following simple classification is used:

I. Paratyphoid B. group:

- (1) Human paratyphoid B. bacilli.
- (2) Paratyphoid B. bacilli of calves, hogs, and foals.
- (3) Meat poisoning paratyphoid B. bacilli.

II. Enteritis (Gärtner) group:

- (1) *B. enteritidis* (Gärtner).—meat poisoning.
- (2) *Paracoli* bacilli of calves.

Lot IV-b consisted of five calves (1229, 1230, 1231, 1234 and 1235).

Lots IV-a and IV-b (10 animals) were check lots and they received until 30 days old no grain nor hay, but whole milk and skim milk as outlined for the other lots.

At the age of 30 days and until they were 90 days old the calves in all lots were to receive:

Skim milk 14 pounds per 100 pounds live weight

Grain mixture 1 pound per 100 pounds live weight

Alfalfa hay ad libitum.

The calves for this experiment were bought promiscuously from local dairies. The whole milk and skim milk were purchased from Berkeley and Oakland creameries and fed to the calves in a raw state. Bacteria counts made on these milks on three occasions showed an average count of 5,000,000 for the skim milk and 250,000 for the whole milk.

The experiment was continued until December 12th, 1914, when, on account of scours and deaths among the calves the feeding experiment was abandoned. The pens were scraped and disinfected and the milk pasteurized by heating with a steam hose to a temperature of 160°F., then allowed to stand for 30 minutes, after which it was rapidly cooled in the cans. After the disinfection of the pens and the pasteurization of the milk, only two new cases developed (Nos. 1235 and 1236), one of which (No. 1236) died. From the autopsies recorded below and from Table V it will be noticed that none of the lots escaped infection. Some of the calves were treated with various agents, but since others received no treatment and recovered, it is impossible to draw any conclusions relative to the efficacy of the agents used.

II. COURSE OF THE EPIDEMIC AMONG THE CALVES. 1. Nov. 2, 1914, calf 1207, lot IV-a, aged 39 days, was chloroformed; had been ailing for several days and had difficulty in breathing. Autopsy (J. T.) revealed necrobacillosis of the larynx.

2. Nov. 16, 1914, calf 1237, lot II, age 30 days, was found dead; decomposition had so far advanced that it made bacteriologic examination unsatisfactory. Diagnosis enteritis.

3. Nov. 21, 1914, calf 1222, lot I, age 57 days, was brought to the Veterinary Science Laboratory. The calf had been scouring since Nov. 19th; on Nov. 20th it had a temperature of 106.6; Nov. 21st the temperature was 106.3 and the animal was killed; autopsy

(J. T.) revealed carcass in poor condition, the tail and tissues surrounding the anus soiled with yellowish nauseating feces. The subcutaneous tissue of the right inguinal region showed a bloody effusion. The thoracic cavity, outside of a large number of small hemorrhages on the epicardium of the auricles and ventricles (probably due to mode of slaughter) and one hemorrhagic infarct in the lung, showed no apparent changes. The abdominal cavity proper showed nothing abnormal. The small intestine viewed from the serous surface showed dark bluish red discolorations. The stomach revealed no noteworthy alterations. The rumen contained about 7 pounds of hay. In the abomasum one large curd, rubber-like in consistency, was present. The entire length of the small intestines was reddened, thickened and hemorrhagic. The greatest portion showed a dark red discoloration. Bloody mucus and a slight amount of yellowish ingesta were contained in the small intestines. The mesenteric lymph nodes were very much enlarged and edematous; hemorrhages were present in the hilus; the large intestines were reddened, and the folds, especially on the ridges, showed linear and punctiform hemorrhages. The liver was enlarged and purplish in color. Gall bladder contained a turbid bile, but was not distended. Spleen was slightly enlarged. The kidneys showed no apparent changes. The bladder contained clear urine, but showed a few petechiae on the mucous membrane.

Cultures from the mesenteric lymph nodes, liver, spleen and gall-bladder showed a motile rod which fermented dextrose and mannit with production of acid and gas, but produced no changes in lactose and saccharose.

Nov. 22, 1914, $\frac{1}{2}$ c.c. of a 24 hour broth culture obtained from the gall-bladder was inoculated subcutaneously into guinea pig 102 and a 1 c.c. dose was given subcutaneously to rabbit No. 3. The guinea pig died 28-XI-14, showing swelling at point of inoculation, but no pus formation. Liver showed several irregular necrotic areas; spleen enlarged; lymph nodes, especially precucular and mesenteric, were enlarged and hemorrhagic. Cultures from heart blood and liver yielded the same organism as inoculated.

The rabbit had been losing weight and was found dead 2-XII-14. No autopsy was performed.

4. *Autopsy of Calf No. 1220 of Lot I:* Died on December 6, 1914; autopsied (K. F. M) on December 7, 1914. Rigor mortis was passed. The cadaver emaciated; the tail and tissues sur-

rounding the anus soiled with yellowish, fecal matter. The subcutis and muscles were rather dry and slightly icteric. The abdominal cavity contained a few c.c. of turbid fluid. The small and large intestines were edematous, deep bluish-red and filled with liquid, slimy, frothy, brownish blood-tinged contents. The mucous membranes were edematous, swollen and covered with bright streaks of red hemorrhages and small blood coagula. The lesions were most marked in the small intestines. The solitary follicles and Peyer's patches were very prominent; the submucosa and muscularis were infiltrated with yellowish exudate. The abomasum contained a casein clot and some hay material mixed with stringy slime. The mucosa was remarkably edematous, deeply folded and reddish gray. On and between the folds were superficial erosions and numerous petechiae; toward the duodenum the inflammation increased in intensity. In the duodenum a slimy bile-stained content covered the thickened and reddened mucous membrane. The mesentery showed distended lymph vessels and prominently enlarged lymph nodes. The nodes were soft, on section grayish, of a medullary appearance, with a few petechia. The spleen was about twice its normal size and its capsule tight. On section the follicles were slightly visible, the pulp soft and deep-brownish. The liver was noticeably enlarged, smooth, shiny, brownish-yellow. The parenchyma was indistinct and a few pin-head sized, grayish foci were noticed. The kidneys were swollen and showed small hemorrhages in the cortex. The lungs were deep red and only slightly collapsed; in the trachea and bronchi a slight blood-tinged mucus found. On the epicardium and pericardium there were a few petechiae. The myocardium was soft, turbid and grayish.

Pathologic-anatomical Diagnosis: Hemorrhagic gastro-enteritis; spleen tumor; acute lymphadenitis of the mesenteric lymph nodes; parenchymatous degeneration of the liver, kidneys and myocardium; focal necrosis in the liver.

Microscopic Examination: Liver: In sections of the liver, fixed and stained as usual, small foci of necrosis and fibrinous exudation were observed. Between the lobuli aggregations of large endothelial cells with slight round cell infiltration were noted. The liver cells showed cloudy swelling and some fatty infiltration.

Spleen: Similar necrosis and endothelial cell foci, as noted in the liver, were found in the pulp. These lesions were identical with the pseudotubercles quite recently studied and described by

Joest¹, so that a further detailed discussion of this observation was superfluous.

Bacteriologic Examination: Heart blood, spleen, liver, mesenteric lymph nodes, kidney and intestinal material were inoculated in bile lactose broth and incubated for 12 hours at 37°C. The cultures thus obtained were plated in Endo and modified litmus-lactose agar. The following findings were recorded:

Heart blood: Gram negative, non-lactose fermenting bacilli pure.

Spleen, Mesenteric Lymph, Liver: ditto; ditto; ditto.

Kidney: ditto; ditto; and a Gram positive coccus.

Jejunum and colon: Gram negative, non-lactose fermenting bacilli pure; cocci and a lactose fermenting bacillus.

The further study of these organisms identified the non-lactose fermenting bacillus as a *B. paracolon*.

5. *Autopsy of Calf No. 1240 of Lot II:* age 24 days; in agony; chloroformed Dec. 7, 1914, and autopsied (K. F. M.)

Pathologic anatomical findings were identical with those of Calf No. 1220. *B. enteritidis* isolated in pure culture from mesenteric lymph nodes, gall-bladder, heart blood and liver.

6. *Autopsy of Calf No. 1230 of Lot IV-b, check lot:* age 51 days old; autopsied (J. T.) December 9, 1914. Anatomical findings identical with those of calf No. 1220 and calf No. 1222. Cultures from heart blood, positive.

7. *Autopsy of Calf No. 100 of Lot II:* age 26 days; autopsied (J. T.) December 9, 1914. Cadaver decomposed; findings similar to those of calves Nos. 1220 and 1222.

8. *Autopsy of Calf No. 1211 of Lot IV-a, Check lot:* 87 days old; autopsied (J. T.) December 11, 1914.

Pathologic-anatomic findings identical with those of calves Nos. 1220 and 1222, excepting that the small intestines showed more blotchy red areas and liver showed many areas of focal necrosis.

Cultures from heart blood, spleen, liver, mesenteric lymph nodes and gall-bladder yielded *B. enteritidis*.

9. *Autopsy of Calf No. 1239 of Lot I:* 32 days old; autopsied (J. T.) December 15, 1914.

This animal was killed and the anatomical lesions were found to be identical with those of calves Nos. 1220 and 1222, excepting

(1) Ztsch. f. Infekt. Kr. der Haustiere, 1914, XV, p. 307-337.

that the large intestines were remarkably pale. Cultures from the spleen, liver, mesenteric lymph nodes and heart blood yielded *B. paracolon*.

10. *Calf No. 1236* died December 25, 1914, 42 days old, but was not autopsied; had been scouring since December 20, 1914 and on that day had a temperature of 105.5.

a. Discussion of the Clinical Symptoms: The records of the enzootic among the calves of the feeding experiment demonstrate that in a comparatively short interval out of a lot of 24 calves 8 succumbed to a disease resembling clinically infectious diarrhea (one dying later). At first the symptoms were not well recognized by the attendants, because an infectious cause was not suspected. In the late cases, however, the well marked course of symptoms, i. e. the depression and weakness of the calves; the inappetency and the rough, lusterless condition of the hair and coat attracted the attention of the observers. As a rule fever could be recorded at that time. In 24 to 48 hours afterward the brownish-yellowish feces, usually blood-tinged and of an exceedingly nauseating, repulsive odor, made their appearance. This condition would last several days, the animal showing gradual loss in flesh, and the abdomen being tucked up. Shortly before death the animals were mostly lying on one side, showing rapid respiration and localized muscle tremors. The temperatures were normal or subnormal, usually unsatisfactory on account of the paralysis of the sphincter ani.

In the fatal cases, with one exception, the animals died within three to five days, and as already mentioned, at least six calves visibly infected recovered. In a few cases the symptoms of intoxication were more marked than the diarrhea.

When comparing these observations with the accounts given by C. O. Jensen¹, J. Poels², Titze and Weichel³, etc., we recognized a similarity to the so-called Paracolibacillosis, so ably described by Jensen. The fact that the calves older than five days were attacked by the disease and that the course was a comparatively long one strongly suggested from the beginning that coli infection was not responsible for the deaths of the calves. The age incidence is apparently a great factor in the clinical diagnosis of calf scours; how-

(1) C. O. Jensen; Kälberruhr in Koue-Wassermann: Handbuch der Pathogenie Microorganismen, II Edit. 1913, VI, p. 126.

(2) Rapport over de Kalverziekte in Nederland, 1899.

(3) Arbeiten a. d. Kais. Gesundheitsamte, Bd. 33, Heft 3, 1910, p. 516.

ever, not to such an extent that a bacteriological examination would be made superfluous. Christiansen⁴ has summarized recently in a very able article on paracolibacillosis the statistics collected at the laboratories in Copenhagen, and he finds that 37.8% of the calves affected with paracolibacillosis were at an age of from 14 days to one month, 27% of one month of age or over and only 7% under 8 days of age. When calf scours occur in the early days of life, we are probably dealing with direct coli infections; in older animals paracolibacillosis is to be suspected. Infections due to organisms other than representatives of the paratyphoid-enteritidis group, like diplococci, pyocyaneous and proteus, occur also in older calves and, therefore, without a bacteriological examination a definite diagnosis is not possible. The cases under discussion are a fair example of this condition.

b. Discussion of the Pathological Anatomy: The post-mortem findings can be considered as characteristic for a paracoli infection, inasmuch as intestinal lesions, accompanied by bacteremia, were present in every instance. The hemorrhagic inflammation of varying degrees was always associated with an exceedingly marked enlargement of the mesenteric lymph nodes. These nodes were at least twice the size of normal, very pale, soft edematous, and only in the cortical zones were a few hemorrhages seen. The septicemia condition was indicated by an acute spleen tumor; the organ was two or three times its normal size; the capsule was very tight and in some instances covered with petechiae and hemorrhages; the pulp was soft and hyperemic and the follicles were indistinct. In one specimen a few small necroses could be detected. The liver was always enlarged, of yellowish-brown color on section and at times showed numerous, grayish foci of necrosis. The general icterus present indicated the severe impairment of the liver. In the dark kidneys, numerous small petechiae in the cortex were present. In one animal the beginning of a hemorrhagic broncho-pneumonia was noted.

These findings correspond in every respect with those described by Thomassen, Jensen, Christiansen and others, and can be considered characteristic. However, when colibacillosis occurs in older calves the lesions resemble greatly those of paracolibacillosis and the diagnosis is difficult. The hemorrhagic diathesis on the spleen and

(4) Paracolibacillose hos Kvaeget; Særtryk of Maanedskrift for Dyrlæger, XXVI. 1915.

epicardium is, however, more marked in colibacillosis than in paracolibacillosis.

The microscopic examination of the liver, spleen and lymph nodes revealed the presence of the well-known necroses which have recently been the subject of numerous publications, particularly by Joest who has described such lesions under the name of pseudotubercles. Christiansen also discusses these conditions in his last report. Doubtless they are characteristic for the infections of the typhoid-paratyphoid organisms in man and in animal, but that they are the sequels of emboli of spleen cells or cells from the lymph nodes, in the sense of Mallory, is not conclusively proven. In fact, Christiansen has infected a splenectomized calf with paracoli organisms and found the usual necroses and pseudotubercles in the liver just as he had observed them in spontaneously infected animals.

The exceedingly toxic character of the organisms causing the enzootic probably accounts for the absence of secondary bronchopneumonia and serous fibrinous exudates on the pleura and peritoneum, which have been mentioned by Jensen and others as usually present.

c. Discussion of the Bacteriological Findings: The blood, organs and intestinal contents were enriched in lactose bile for about 12 hours, and then spread on a modified litmus-lactose medium (100 c.c. of Liebig's 3% agar, reaction plus 0.4, mixed with 13 c.c. of a 1% lactose-litmus solution, previously sterilized in a water bath). The pure cultures obtained from the heart blood or organs were in every instance transplanted on various media; the reactions and changes noted are shown in Table I. The fermentation of the carbohydrates are tabulated in Table II. The organism was isolated without difficulty from the heart blood, the intestines, liver, spleen, etc. It is a short rod, with rounded ends, stains easily with the ordinary aniline dyes, but is not Gram nor acid fast. In alkaline broth, short coccoid or long filaments with marked motility were constantly seen. The cultural characteristics studied in comparison with many other bacteria show that the organism is a member of the paratyphoid-enteritidis group.

TABLE I. CULTURAL CHARACTERISTICS

Day after inoculation	Litmus lactose agar	Endagar	Agar	Caseine	Broth	Indol.	Glucose broth.	Lactose broth	Maltose broth	Milk	Bersinow I	Bersinow II	Metach solution	Neutral-red agar
1	Round, blue, transparent, colonies.	Colorless colonies	Grayish fine colonies, easily coalescing	Whitish gray colonies, no liquefaction	Diffuse turbidity from 1st day on	Neg- ative	Turbid- ity acid & gas forma- tion	Turbid- ity No gas	Turbid- ity acid & gas forma- tion	No change	Redden- ing, co- agula- tion & gas	Un- changed	Redden- ing, co- agula- tion & gas	Un- changed
2		Slightly pinkish colonies					Ditto	Ditto	Ditto	Ditto	Ditto	Ditto	Ditto	Slight Fluor- escence
3		Ditto					Ditto	Ditto	Ditto	Ditto	Ditto	Ditto	Ditto	Ditto
4		Ditto					Ditto	Ditto	Ditto	Alka- line	Ditto	Ditto	Ditto	Ditto
14		Ditto					Ditto	Ditto	Ditto	Clear- ing, yellow- ish and liquid	Ditto	Deeper blue	Ditto	Ditto

TABLE II. FERMENTATION OF CARBOHYDRATES

The tests were carried out as follows: the sugar free media with the respective carbohydrates, inoculated with the strains isolated, were incubated for 5 days and then titrated with 1/20 N. NaOH.

Designation of strain:	Glucose 1%	Levulose 1%	Saccharose 1%	Maltose 1%	Lactose 1%	Raffinose 1%	Mannite 1%
<i>B. enteritidis</i> 1239	4.0 % acid	3.60% acid	0.3 % alkaline	3.6 % acid	0.2% alkaline	0.2% acid	2.90% acid
<i>B. enteritidis</i> 1222	3.9 % acid	3.35% acid	0.3 % alkaline	3.5 % acid	0.1% alkaline	0.3% acid	2.65% acid
<i>B. enteritidis</i> 1220	4.05% acid	3.70% acid	0.0	3.4 % acid	0.1% alkaline	—	2.90% acid
<i>B. enteritidis</i> 1211	4.10% acid	3.50% acid	0.1 % alkaline	3.35% acid	0.2% alkaline	—	2.90% acid
<i>B. enteritidis</i> 1230	3.45% acid	3.50% acid	0.0	3.25% acid	0.2% alkaline	—	2.55% acid
Experimental calf No. 1	4.10% acid	3.15% acid	0.0	3.30% acid	0.2% alkaline	—	2.60% acid
Controls	1.5 % acid	1.25% acid	1.85% acid	1.80% acid	1.5% acid	1.2% acid	1.10% acid

TABLE II (Cont.). FERMENTATION OF CARBOHYDRATES

Designation of Strain:	Dulcite 1%	Galactose 1%	Rhamnose 1%	Salicin 1%	Dextrin 1%	Arabinose 1%
<i>B. enteritidis</i> 1239	2.60% acid	3.20% acid	2.70% acid	0.0	0.30% acid	4.30%
<i>B. enteritidis</i> 1222	2.70% acid	3.25% acid	2.70% acid	0.55% alkaline	0.20% acid	—
<i>B. enteritidis</i> 1220	2.70% acid	3.00% acid	2.70% acid	0.60% alkaline	0.00	4.0 %
<i>B. enteritidis</i> 1211	2.70% acid	3.15% acid	2.35% acid	0.40% alkaline	0.15% alkaline	3.8 %
<i>B. enteritidis</i> 1230	2.60% acid	3.10% acid	2.40% acid	0.25% alkaline	0.20% acid	4.0 %
Experimental calf No. 1	2.65% acid	3.15% acid	2.35% acid	0.15% alkaline	0.1 % acid	4.10%
Controls	1.10% acid	1.30% acid	0.95% acid	1.40% acid	1.10% acid	1.9 %

The fermentation of the arabinose was very characteristic, inasmuch as only after several transplants an arabinose fermenting "mutant" was obtained. The strains behaved in every respect like the *Bacillus enteritidis* described by Titze and Weichel, Christiansen and others. For further identification, the bacillus was tested with various agglutinating sera and the following results were obtained:

TABLE III

Antisera	Bacillus isolated from calf 1239
<i>B. Typhosus</i> (Cross)	1:200
<i>B. paratyphosus</i> A (polyvalent 1, 2, 3)	0
<i>B. paratyphosus</i> A (G)	0
<i>B. paratyphosus</i> B (4 & 5)	0
<i>B. paratyphosus</i> B (homo)	0
<i>B. suipestifer</i> (G)	0
<i>B. suipestifer</i> (V)	0
<i>B. enteritidis</i> (A.M.N.S.) (1:10,000)	1:10,000
<i>B. enteritidis</i> (G) (1:10,000)	1:10,000
<i>B. typhi murium</i> No. 1.	1:10,000
<i>B. abortus equarius</i>	0
<i>B. typhi suis</i>	0
<i>B. Voldagsen</i>	0

TABLE IV

Strains of calves No.	1211	1229	1222	1230	1239	1239(P)
Antiserum <i>B. enteritidis</i> (GS 1:40,000)	1:10,000	1:8,000	1:20,000	1:20,000	1:10,000	1:20,000
Antiserum <i>B. enteritidis</i> No. 18 (1:6,000)	1:2,000	1:1,000	1:1,000	1:2,000	1:2,000	1:2,000

TABLE V

Examination to determine the existence of carriers among the remaining calves.

No.	Calv	Lot No.	Clinical symptoms and temperatures on following dates	Agglutination of Serum Feb. 6, 1915	*Feces examination enriched in bile broth
1	1201	IVa	104.6 (11-XII-14), 103.0 (12-XII-14)	0	Staphylococci, B. coli and streptococci
2	1210	IVa	106.2 (9-XII-14), 108.0 (12-XII-14)	0	B. Coli, staphylococci
3	1213	IVa	No symptoms	0	.....
4	1215	III	No symptoms	0	Staphylococci and B. coli
5	1216	III	No symptoms	1:100	B. coli & staphylococci
6	1217	III	No symptoms	0	B. coli
7	1218	III	No symptoms	0	.....
8	1219	III	Visibly sick, blood-tinged diarrhea; 107 (7-XII-14) 106.2 (8-XII-14), 106.8 (9-XII-14), 106 (10-XII-14, and remained high for several days	1:100	B. coli, staphylococci and B. alkigenes
9	1228	I	No symptoms	0	B. coli and B. meta-coli
10	1229	IVb	104.6 (8-XII-14) weak, 104 (9-XII-14)	0	Staphylococci, streptococci and B. coli
11	1231	IVb	No symptoms	0	Staphylococci and B. coli
12	1234	IVb	Sick and scouring, 103.6 (11-XII-14) 104.5 (13-XII-14)	1:100	B. coli and B. alkigenes
13	1235	IVb	Visibly depressed and blood-tinged feces, 103.7 (30-XII-14) 103 (7-1-15) 103 (12-1-15)	1:200	B. coli
14	1241	II	103.6 (11-XII-14), 103.8 (13-XII-14), 103.4 (23-XII-14), 102.3 (25-XII-14)	0	B. coli and B. staphylococci
	Control,		Healthy, non contact	0	.....

*Bacteriological examination of feces made by Miss Grace Griffith.

The isolated bacteria are pathogenic for guinea pigs and rabbits. They produce exceedingly active toxins. Even the smallest doses when repeatedly applied to rabbits will cause loss in weight and a predisposition to secondary infections to which the animals invariably succumb. The organisms isolated from the various calves are typical representatives of the *Bacillus enteritidis* Gärtner group.

Pathogenicity tests on calves: To strengthen the bacteriological findings and the conclusions that the enzootic among the calves was caused by the *Bacillus paracolon*, two feeding experiments were carried out. These experiments, of which records are given below, demonstrated the high pathogenicity of the isolated organisms for calves. Both animals promptly developed clinical symptoms, but only the first calf, which was three weeks old, succumbed to the infection; the second one—38 days old—was temporarily sick, but recovered. Since the serum examination of the second calf revealed an agglutination of 1:1,000 with the *Bacillus enteritidis* Gärtner, 14 days after feeding, it may be safely assumed that this animal was really infected, but survived, in the same manner as the six other calves which were affected in the outbreak and recovered.

III. FEEDING EXPERIMENTS: (1) Calf No. 1, raised at the University Dairy, 17 days old, was fed (J. T.) with pasteurized milk containing 25 c.c. of a broth culture of strain 1239, January 14, 1915.

On January 15, 1915, the animal showed a temperature of 106.0, a very severe diarrhea of repulsive odor and was very depressed.

January 16, 1915: The animal was somewhat more active; maximum temperature 103.0; the diarrhea was still very marked and of bad odor.

January 17, 1915: found dead in the stable.

Autopsy (by K. F. M. and J. T.): Rigor mortis was still present. The muscles were slightly icteric. In the peritoneal cavity there was a small amount of fluid. The intestines were deeply reddened, swollen and content was blood-tinged and slimy. The mucosa was edematous and studded with hemorrhages; the hemorrhagic inflammation was found in the jejunum and ileum. The cecum was slightly reddened and had a slimy content. The spleen was small and dry. The liver was dark-brownish, architecture indistinct and showed a few focal necroses. The kidneys were slightly swollen and turbid. Mesenteric lymph nodes were considerably enlarged, even for the age of the animal; soft and grayish on section; in the cortex there were a few hemorrhages. The lungs were collapsed and grayish-red; the myocardium, grayish, turbid; the blood, well coagulated.

Pathologic-anatomical diagnosis: Hemorrhagic enteritis, lymphadenitis, degeneration of the parenchymatous organs.

Bacteriological examination of experimental calf: The enriched cultures from the various organs gave the following results:

Mesenteric lymph nodes: *B. paracolon*.

Liver: *B. paracolon*.

Spleen: *B. paracolon*.

Heart blood: *Streptococci*.

Bile: *Streptococci*.

Small intestines: *B. paracolon*, *streptococci* and *B. coli*.

Control test of feces from University Dairy calves on 18th, 19th and 21st of January, 1915, enriched in bile, were negative for the *B. enteritidis*.

(2) Calf No. 2: age 38 days, was fed (by J. T.) 25 c.c. of 1239 on January 27, 1915; showed a rise in temperature and diarrhea, but apparently recovered in a short time.

Jan. 28th—105.3, drank all the milk fed.

Jan. 29th—105.0, drank well, blood stained feces.

Jan. 31st—102.6, blood-streaked feces.

Feb. 1st—104.0, diarrhea and very depressed.

Samples of feces examined on 4th and 5th of February, 1915; negative. Blood examined February 13th, 1915, gave an agglutination 1:1000.

The two calves were raised at the University and neither had been sick nor directly exposed to the infection before entering this experiment. They were under our observation from January 11, 1915, and at no time before the feeding of the cultures did these animals show a rise of temperature or other indication of disease. While under our observation the calves were fed pasteurized whole milk and skim-milk with a little grain and hay.

IV. DISCUSSION OF THE OUTBREAK FROM AN EPIDEMIOLOGICAL VIEWPOINT: We attempted to explain in what manner the infection was introduced. It is the general belief that paracolibacillosis is a stable infection, or is introduced either by milk or by means of apparently healthy carriers. That the disease was the result of stable infection could naturally not be investigated inasmuch as the calves used in the feeding experiments came from various dairies. The suspicion was then directed toward the milk, but only indirect evidence is available that this food was responsible for the introduction of the infection, since from the moment the milk was pasteurized only two new cases developed, which, however, may as well have been infected previous to the pasteurization of the milk.

At the same time, thorough disinfection was carried out. That the milk occasionally harbors the *Bacillus enteritidis* Gärtner, has been shown by Zwick², Hubener³, and Klein⁴, etc., particularly when collected from animals which are suffering from various forms of mastitis. The report of the government veterinarians for the State of Oldenburg in Germany⁵ mentions that in 1902 the number of cases of calf scours was very small. Several veterinarians and farmers attribute this result to the obligatory pasteurization of the milk in the creameries. According to Tapken the infectious diarrhea has frequently been spread by the use of unboiled, skimmed or whole milk.

To what extent carriers were responsible for the infection, we could not determine, since we had no opportunity to investigate this point before the calves were placed in the feeding experiments and are, therefore, unable to express a definite opinion on the debatable question, whether or not calves can harbor the paracoli organisms. The reports in literature are contradictory on this point. Titze and Weichel and Ammann have examined over 304 healthy calves, but failed to find paratyphoid or paracoli organisms. Morgan and Eckbert, Horn and Huber and Christiansen, however, state in their reports that they have isolated paratyphoid-like organisms from healthy calves. Christiansen, therefore, draws the conclusions that the paracoli organisms are constant inhabitants of the intestinal tract and acquire pathogenic properties under certain conditions and are then responsible for the enteritis. It is quite apparent that the explanation given by him is following closely the ideas of C. O. Jensen, brought forward by this writer to explain the coli infections in calves. We have no experimental evidence to support or refute this contention, but feel justified from observations in laboratory epidemics in mice in calling attention to this possibility, even though in our limited feces examinations from healthy calves we failed to find the organisms. Titze and Weichel on the other hand have shown that calves, recovering from paracolibacilliosis frequently eliminate the specific organism for at least 14 days. The danger caused by such temporary carriers is quite apparent and does not need further discussion.

In this outbreak we were interested to know if such a condition

(1) Oldenburgischer Veterinärbericht 1912; reference. Berlin tierarzt Wochenschr. XXI. 1915, page 354.

(2) Arb. ad. Kaiser Gesundheitsamt Bd. 33, 1910.

(3) Deutsche Med. Wochenschrift 1908, No. 24.

(4) Centbl. f. Bakt. Abt. II Bd. 38, 1905.

existed among the remaining 14 calves and two months after the first death among the calves was recorded, a serum test and a bacteriological examination of feces of these bovines were made. The results are tabulated in table V. None of the animals showed paratyphoid-like organisms in the feces; four animals (1216, 1219, 1234 and 1235) showed agglutinins for the *B. enteritidis* and the isolated causative agent of this outbreak. Three of these animals, (1219, 1234 and 1235) were clinically diseased and doubtless infected. The bacteriological examination was only carried out once and is of slight significance, since the organisms of the paratyphoid group are frequently eliminated in intervals only and one examination is insufficient to permit the conclusion that these animals were not latent carriers.

The manner by which the infection was introduced in the feeding experiment could not be determined, but we feel that the raw milk was probably responsible for the enzootic.

V. IDENTITY OF THE ISOLATED *B. PARACOLI* WITH THE *B. ENTERITIDIS* (GÄRTNER) AND THE MEAT POISONING ORGANISM. The fact that the isolated organism gave all the identity reactions of the *B. enteritidis* Gärtner and behaved serologically as such opens also the question whether or not this organism is identical with the meat poisoning organisms. Most of the German investigators conclude that the *B. enteritidis* is identical with the *B. paracoli* of calves, because one is unable to separate the organisms of the Gärtner group according to their pathogenicity for laboratory animals. Through epidemiological investigations we have gradually become accustomed to believe that cases of meat poisoning are due to intravital infection of the meat or food stuffs and not post-mortem contamination by carriers, but from observations in recent years upon paratyphoid B. infections in man, on the other hand, we know that meat is only responsible for infection in a small number of cases and one feels in studying the recent literature that the early conceptions are gradually being modified.

Paratyphoid infections of pork are so common in countries where hog cholera exists that paratyphoid epidemics would be more frequent than is actually the case were the paratyphoid organisms from these species pathogenic for man. The same may hold true relative to the *paracoli* organisms of calves; and even if they are biochemically and serologically identical with the *B. enteritidis* Gärtner, they are as a rule little virulent for man and rarely

possess as high a pathogenicity for man as the true meat poisoning organisms.

Among the staff of investigators, assistants, stablemen, etc., all of whom came in very close contact with cultures, post-mortem material, feces, etc., only one individual, who suffered from chronic mucous colitis and was therefore abnormally predisposed, contracted a severe enteritis in which the paracoli bacillus isolated from calf 1239 was found to be the cause. Inasmuch as the patient completely recovered, and was found to be no longer a carrier, the question of how animal pathogenic *B. enteritidis* occasionally become modified to a human pathogenic organism could unfortunately not be solved. We suspect, however, that under practical epidemiological conditions the susceptibility of the individual plays an important role in transforming animal pathogenic paracolon to a human pathogenic one.

We feel that the above discussion concerning the relation of animal diseases to human infection was appropriate and hope it will stimulate further and more accurate investigations than we were able to conduct.

CONCLUSION

B. enteritidis (Gärtner) is responsible in the United States for certain forms of infectious diarrhea in calves. Our knowledge concerning *B. enteritidis* and paracoli infections, especially in bovines in this country, is very limited. Mohler and Buckley¹ report an enzootic among adult cattle from which they isolated as the causative agent, an organism which belongs to the paratyphoid-enteritidis group. During the course of their extensive investigations they infected a five months old calf by intravenous injection, producing visible indications of the disease including scours. The animal died within three days after inoculation. The subcutaneous injection into another calf caused local and thermic reactions. This calf they subsequently fed with a culture without causing any ill effect and they state "It was unfortunate that this feeding experiment should have been made with an animal previously inoculated with this bacillus, as it seems highly probable that a more or less immunizing was occasioned thereby". Reports of human infections due to *B. enteritidis* (Gärtner) are also rare in this country. Hogan² reports food poisoning in California which he attributed

(1) Nineteenth Annual Report of the B. A. I., 1902, p. 297-331.

(2) California State Board of Health-Bulletin, Vol. IV, Dec., 1908, p. 67-69.

to the meat poisoning bacteria, but since serologic tests were not conducted it is not definitely established whether these cases which were thought to be due to the consumption of beef were actually caused by *B. enteritidis* (Gärtner). Torrey and Rohe³ in their studies in canine distemper mention *B. enteritidis* as an important secondary invader.

Our observations do not permit definite conclusions as to the prevention and treatment of infectious diarrhea occurring in calves after the first few days of their lives; they do, however, suggest that when milk of an unknown quality is fed to calves it should be fed in a pasteurized condition.

Symptomatic treatment is, as a rule, not satisfactory and not much can be expected from either serum or serum and bacterin treatment unless the specific organism is employed in the production of these biologic products.

(3) Jrn. of Medical Research XXVII, 1912, p. 315.

A REPORT UPON AN OUTBREAK OF FOWL TYPHOID*

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Although fowl typhoid has been recognized as such in but few instances in the United States, we believe that in many cases of so-called fowl cholera, fowl typhoid was the real cause of loss and was not recognized because this disease has not received the attention accorded to fowl cholera.

Attention was first called to this disease in 1894 by Theobald Smith who found it to be present in Rhode Island. The following year Moore studied the same disease in Virginia and the first graphic account of an organism as a causative factor coupled with a description of the symptoms, morbid anatomy and the specific organism was presented by him at that time. He isolated and described an organism which he named *Bacterium sanguinarium* and which he

*Presented at the meeting of the A. V. M. A., Section on Sanitary Science and Police, Oakland, Cal., September, 1915.

showed to be the specific causative factor. He suggested the name "Infectious Leukemia" for the disease. Further investigation, however, has shown that the disease is not a true leukemia, but rather a leucocytosis brought about by the infecting organism. Curtice studied an outbreak of the disease in Rhode Island in 1902 and gave it the name of "Fowl Typhoid." This latter nomenclature seems to be more applicable and was accepted by Moore in a later publication. In 1913 Pfeiler and Rehse described the organism anew under the name *B. typhi gallinarum alcalifaciens*.

A brief history of the outbreak which led to the investigation of the disease in California is as follows: In the spring of 1912 a poultry raiser in San Francisco lost several fowls rather suddenly from a disease which seemed to occur sporadically, but which did not spread to other members of the flock. The birds of the flock were kept in small lots of 12 to 25 each. Seven or eight mature hens succumbed to the first attack. A post mortem revealed yolk of eggs in various stages of development and all appeared to be ruptured. Considerable yolk substance was also present in the abdominal cavities of the birds. The owner informed the writer that he attributed the cause of death to "broken eggs" and thought nothing further about it. The carcasses were buried in one of the yards where the dirt was loose and no further trouble occurred during the year.

At the time our attention was first called to the disease the owner gave the following history:

"On May 5, 1913, I had 70 hens and pullets one year old and over, 6 breeding males, and 260 chicks of various ages. The birds commenced to die about the 7th or 8th of May, 1913. The first to succumb were laying hens which had been allowed to run outside the yards and had access to the burial place of those which died last year. The birds did not seem to become affected in any regular sequence, but came down in bunches of 6 to 10 at a time and at intervals of several days. The yolk condition noted in those which died last spring was present, also a peculiar pale condition of the kidneys which led me to suspect poisoning. The birds having been given quite a quantity of water cress for green food, I attributed this as the cause of death, because the contents of the intestines had a more or less greenish tinge.

"An interval of two weeks elapsed before any more birds showed symptoms and these were observed more closely. The first

symptom noticed was the drowsy or sleepy appearance of the affected birds. Soon after, the droppings became soft and of a yellowish color, occasionally streaked with green. They were especially green from one male bird. The birds showed a disposition to stay on the roost, unwilling to move about, sleepy most of the time, head down into the ruff or hanging pendent. They would be sick for 5 to 10 days then die. Both males and females were affected.

"Postmortem examination showed kidneys to be from clay to terra cotta colored, sometimes streaked with red showing capillary congestion and the ureters were filled with a semi-solidified urine. Quantities of free yolk were present in the abdominal cavity of the hens and occasionally the mesentery would be dotted with dark spots. Still believing the birds to be dying from some form of poisoning especially affecting the kidneys, I sent the backs containing the kidneys from several birds to the chemical laboratory for analysis, but no evidence of poison was found."

It was at this time that the writer was asked to make an investigation of the disease. On visiting the place July 25, we found about twenty-five birds consisting of Rhode Island Reds, Barred Rocks and White and Brown Leghorns, both male and female. Nine Rhode Island Red hens were sick at the time. The runs and houses were dry and free from any decaying matter. The sanitary conditions were far above the average. The roosts and dropping boards were clean and the dropping boards had been freshly dusted. The nine affected hens were housed by themselves and showed the same symptoms as those already described. They had been affected three or four days at the time we saw them. The most striking symptom observed at that time was extreme sleepiness and a tendency to remain on the roost. Diarrhea was present in about half of the cases. No young birds were seen as they had been sold for slaughter in an attempt to reduce the economic loss as far as possible. Only a few of the younger birds had died. They appeared to be less susceptible to the disease than the mature fowls.

In young chicks, however, the disease seemed to be very rapidly fatal. A large percentage of several hatches died in from a few days to several weeks of age, all showing the same symptoms observed in the older birds and upon postmortem no pronounced lesions were found, save a peculiar paleness of the intestines and kidneys.

Disinfection of the pens was advised, also permanganate of potash in the drinking water. Instructions were left to send the first dead bird to us for examination.

POSTMORTEM NOTES. July 31. Adult Rhode Island Red hen in good condition. Died on the 12th day after symptoms appeared. Comb and skin about head pale and anemic. Visible mucous membranes pale. Peritoneum pale and showed a yellowish exudate. Intestines pale, contents normal, oviduct somewhat congested. Numerous egg yolks present, varying in size from one to two millimeters in diameter. Some of the larger yolks ruptured. Liver slightly enlarged, very friable, dark red in color with darker red markings occurring in streaks. Indistinct areas of necrosis one to two millimeters in diameter, color of clay evidently under liver capsule. Kidneys swollen, of a clay color with a few narrow red streaks on the surface. Spleen slightly enlarged, lungs normal, heart muscle pale with a peculiar irregular mottling of a light gray color. Blood of heart all contained in auricles very thin and watery.

Cultures were planted on slant agar from liver, oviduct and heart blood. In 24 hours the cultures from the liver and heart blood showed a growth of a short rod-shaped organism, 1 to 2 microns in length with rounded ends. It grew singly or in pairs. It took the aniline stains but feebly showing a dark periphery and lighter center. It did not take the polar stain shown by certain species of the *Pasteurella* group. Cultures from oviduct mixed.

Aug. 4. Barred Rock adult hen in good condition. Died on the 15th day. Dead 48 hours when received. Organs practically same as in the first bird except liver and kidneys. Liver still more enlarged, very friable, red streaks more pronounced. Clay colored necrotic areas absent. Kidneys chocolate brown in color and showing pronounced red streaks and congestion. Mucous membranes, and peritoneum pale. Cultures made on slant agar from auricular blood showed pure culture of the same organism found in first dead bird.

The morphology of the organism isolated from the dead birds, its cultural and biochemic properties, together with the symptoms and morbid anatomy led us to suspect the presence of fowl typhoid. We made a visit to the place where the disease had existed for the purpose of studying the blood of the affected birds, but found that the entire flock had been destroyed.

In order to ascertain the period of incubation, study the clinical symptoms of the disease, carry on some inoculation experiments and verify our pathological findings, we secured a number of fowls of various breeds from a local poultry supply house.

Inasmuch as this disease had been described as affecting the normal blood content, the examination of the blood was begun as soon as the experimental birds were inoculated. The results of these examinations were as follows:

TABLE NO. I

Experimental Fowl No. 1. White Leghorn Cockerel.

Date	Temp.	Red Cells	Leucocytes	Remarks
Aug. 8	108.1	3840000	20220	Injected 1 c.c. 30 hour bouillon culture in wing vein at 6 P.M.
Aug. 9	107.	3468000	45220	Diarrhea present.
Aug. 10	109.4	3332000	35600	
Aug. 11	108.6	3036000	31000	
Aug. 12	107.2	2888000	61000	
Aug. 13	107.8	2592000	89440	Writer ill, no further blood count made for some time.
Aug. 14	107.			
Aug. 15	107.2			
Aug. 16	106.5			
Aug. 17	106.	2780000	62320	
Aug. 18	106.2			
Aug. 19	106.4			
Aug. 20	106.			
Aug. 21	106.4	2924000	51280	At this date we learned that this bird had been fed viscera from a fowl out of the affected flock a couple of weeks before.
Aug. 22	106.5			

This bird was in apparently perfect health at the time it was killed and a postmortem examination made. (Aug. 29). The only pathological lesion found was a slightly enlarged and dark colored liver. Cultures were made on slant agar from spleen, liver and kidneys. A pure culture of the organism under observation was obtained from the spleen. The tubes inoculated from the liver and kidneys remained sterile.

Plate cultures in series made from the rectum showed, among many others, probably colon, several colonies resembling those of the organism causing fowl typhoid. From one of the colonies, *Bacterium sanguinarium* was recovered and was shown by the cultural characteristics and the morphology.

TABLE NO. II

Experimental Fowl No. 2. Rhode Island Red hen 1 yr. old (fat)

Date	Temp.	Red Cells	Leucocytes	Remarks
Aug. 9	105.9	3068000	27600	Inoculated in wing vein with 10 min. 24 hour bouillon culture at 3 P. M.
Aug. 10	108.4	2872000	92000	Indifferent to food.
Aug. 11	108.2	2800000	178000	
Aug. 12	108.1			
Aug. 13	107.6	2392000	192000	Many blue stained red cells observed
Aug. 14	104.6			At this date writer was taken ill and only temperature of bird was observed.
Aug. 15	105.6			
Aug. 16	108.4			
Aug. 17	110.			
Aug. 18	110.8			
Aug. 19	111.			Found dead at 8 A. M.
Aug. 20				

POSTMORTEM. Comb and skin of head somewhat darkened. Mucous membranes pale and anemic. Liver greatly enlarged and showed numerous necrotic areas. Spleen enlarged to about five times normal size, dark color and of the consistency of the spleens of cattle which have died from anthrax. Intestines pale, petechial hemorrhages on serous and mucous surfaces, kidneys muddy yellow color showing congestion of the capillaries. Lungs normal, heart covered with fat and normal. Blood all in auricles, thin and watery. Examination of smears made from spleen, liver and kidneys showed the presence of the organism. Pure cultures of *Bacterium sanguinarium* were obtained from liver, spleen, kidney and heart blood.

TABLE NO. III

Experiment Fowl No. 3.

Spangled Wyandotte Hen.

Date	Temp.	Red Cells	Leucocytes	Remarks
Aug. 20	106.4	3740000	21282	Fed spleen and portion of liver and kidney of Exper. fowl No. 2.
Aug. 22	107.8	3268000	32300	Indifferent to food.
Aug. 24	109.5	2017000	74680	
Aug. 26	108.9	2628000	35620	
Aug. 27	107.2	3332000	32540	Blue stained red cells observed.
Aug. 28	107.5			
Aug. 29	107.	3028000	19100	
Aug. 30	107.6			
Aug. 31	107.4			
Sept. 1	107.1	3356000	22440	Apparently healthy.
Sept. 3	107.			Apparently healthy.
Sept. 15				Remained well. Recovered.

TABLE No. IV
Experimental Fowl No. 4. White Wyandotte hen (Very fat)

Date	Temp.	Red Cells	Leucocytes	Remarks
Aug. 24	106.8	3274000	20220	Fed culture of Bact. Sanguinarium at 9 A. M.
Aug. 25	107.	2113000	21000	
Aug. 26	107.	2042000	34400	
Aug. 28	108.1			
Aug. 29	109.8	2000000	98700	Comb pale. Slight diarrhea. Visibly sick. Many blue stained red cells seen.
Aug. 30	110.2			
Aug. 31	111.2	1720000	138670	
Sept. 1				Found dead at 9 A. M.

POSTMORTEM. Mucous membranes of head very pale. Intestines pale and abdominal cavity contained quantity of straw colored liquid. Contents of intestines apparently normal. Liver somewhat enlarged, very friable, and showing areas of necrosis. Spleen dark colored, greatly enlarged. Heart muscle pale, blood thin and watery and all contained in auricles. Cultures planted on slant agar showed in 24 hours pure culture of the organism..

TABLE No. V
Experimental Bird No. 5. White Leghorn Cockerel.

Date	Temp.	Red Cells	Leucocytes	Remarks
Sept. 1	107.8	2874000	17330	Fed culture of Bact. sanguinarium from rectum of Exp. bird No. 1.
Sept. 2	108.	2532000	47280	
Sept. 3	108.4	2068000	72300	
*Sept. 4				

*At this date the writer was called to another part of the state so did not have a chance to make daily observations upon this bird. On Sept. 20, however, we learned that this bird died on Sept. 9, 1913.

During our investigation of this disease we made differential leucocytic counts upon the blood of fowls affected with the disease and that of healthy fowls. The appended tables show a comparison of our results:

TABLE No. VI
Differential Leucocyte Counts upon the Blood of Diseased Birds.

Bird No.	Red Cells	Leucocytes	Percentage of Varieties				
			I	II	III	IV	V
			Lymphocytes	Large Mono-nucl.	Polynuclears	Eosins	Mast Cells
I	2592000	89440	23.2	4.2	67.2	1.8	3.5
II	2392000	192000	18.3	2.7	77.1	0.4	1.5
III	2017000	74680	31.6	7.8	53.1	5.7	1.8
IV	2047000	138670	21.2	3.6	88.1	2.2	4.8
V	2068000	72300	20.5	15.7	63.5	0.1	0.1

TABLE NO. VII

Differential Leucocyte Counts upon the Blood of Healthy Fowls.

Bird and Breed	Leucocytes	Percentage of Varieties				
		Lympho- cytes	Large Mono- nucl.	Polynu- clears	Eosins	Mast Cells
No. I Wh. Wyan.....	20220	56.7	6.	33.2	1.9	2.6
No. II Wh. Legh....	17330	42.7	10.2	41.6	2.3	3.2
No. III Wh. Wyan...	22440	60.1	8.2	25.5	3.4	2.8
No. IV B. Rock....	28372	42.2	14.2	35.6	3.9	4.1
No. V B. Rock.....	30017	54.6	6.6	29.3	6.8	2.7

The above tables show that the increase in leucocytes is confined almost entirely to the polymorphonuclear variety which of course affects the total percentage of the other varieties.

In view of the fact that our findings differ somewhat from those of Moore and Dawson, we give below what we found to be the morphological, cultural and biochemic properties of *Bacterium sanguinarium*.

MORPHOLOGY. The individual organisms are short rods with rounded or somewhat pointed ends. They usually occur singly but in clumps or masses from tissue, while in culture they may appear in pairs united end to end. In size they vary from .3 to .5 microns broad and 1 to 2 microns long. There seems to be a peripheral arrangement of the protoplasm observed when stained with fuchsin or methylene blue. This is especially noticeable in smears made from diseased tissue. It is Gram negative.

CULTURAL AND BIOCHEMIC PROPERTIES. The organism is aerobic and facultative anaerobic. It grows readily at from 34 to 37.5 degrees centigrade, somewhat less vigorously at room temperature.

Plain Bouillon. Uniform cloudiness in the media appears at the end of 24 hours. Slight friable sediment but on further incubation sediment becomes more pronounced and viscid, showing pellicle. The reaction is slightly acid during the first 24 hours of growth, later it becomes alkaline.

Sugar Free Bouillon. Uniform cloudiness is seen in the tube at the end of 24 hours. Sediment somewhat pronounced and slightly viscid. The reaction is at first alkaline but at 48 hours distinctly acid with more sediment, viscid in character. Indol is not produced in this medium.

Agar. On agar slant cultures at the end of 24 hours the growth is vigorous and spreading. Growth appears to be made up of indistinct and coalesced colonies. The border is entire and the

growth slightly raised. With the hand lens a granular appearance is observed. It also shows some viscosity when touched with the needle.

On 1% agar plate cultures, the colonies appear as smooth, round, glistening discs, 5 to 8 millimeters in diameter. They are of a very light chocolate brown color by reflected light, slightly raised and with entire borders. Under a two-thirds objective there is a dark center, outside of which is a finely granular zone shading off into a transparent outer border.

Gelatin stab. The growth is moderate, appearing granular all along the line of the needle puncture, slightly spreading at the surface. In 48 hours the growth is vigorous along the line of the needle puncture with feathery like projections into the substance of the medium, the surface growth is not more than at 24 hours.

Milk. There is no visible change in this medium until a long period of incubation has taken place. The reaction tends as time goes on to become more and more alkaline, and at the end of 32 days distinct saponification has taken place and the reaction is very strongly alkaline.

Litmus Milk. The growth in this medium is quite similar to that in plain milk although no saponification has taken place even at the end of four weeks.

Potato. A moderate brownish yellow raised growth appears at the end of 24 hours. At 48 hours the growth is darker in color, glistening in appearance, and old cultures show a muddy brown color. The growth on this medium very closely resembles that of the glanders organism.

Egg Medium. Very slight blistery appearing growth at the end of 24 hours. In 48 hours the character is unchanged.

ACTION ON SUGAR. *Dextrose.* There is uniform cloudiness throughout the tube in 24 hours. The reaction is acid but no gas is formed. On further incubation the acidity becomes more pronounced but no gas is formed even at the end of 72 hours.

Lactose. A slight cloudiness appears in the open arm and curvature of the tube in 24 hours although the closed arm remains perfectly clear: no gas is formed. The reaction is slightly alkaline, becoming more alkaline upon further incubation with slight sediment.

Saccharose. A very slight cloudiness appears in the open arm of the tube in 24 hours: the closed arm is clear. No sediment occurs: the reaction is at first neutral becoming alkaline in 72 hours: no gas is formed.

RESISTANCE OF THE ORGANISM. The action of direct sunlight upon the organism destroyed it in 25 minutes. It will live for 32 hours in the dark in the dried condition. It is killed by a temperature of 60 degrees C. in 10 minutes.

A 3% solution of phenol destroyed it in 8 minutes.

INOCULATION EXPERIMENTS ON OTHER ANIMALS. *Guinea Pig.* A female guinea pig of 460 grams weight was inoculated per subcutem with .3 c.c. of a rich bouillon culture of *Bact sanguinarium* on Aug. 15 and was found dead at 8 A. M. on Aug 20. The organism was recovered from the tissues.

Rabbit. A good sized rabbit inoculated intraperitoneally with 1 c.c. of a 24 hour bouillon culture showed for the first 24 hours a slight rise in temperature, profuse watery diarrhea, and dumpishness, but soon recovered and remained well.

During the past few years quite a little attention has been accorded to a disease of fowls which although primarily being studied as a disease of young chicks is now recognized as affecting adult fowls. This disease is known under the names bacillary white diarrhea in chickens and also as fatal septicemia of chickens. In 1908 Rettger and Harvey published their findings upon the study of this disease and announced the discovery of an organism which they named *Bacterium pullorum*. In 1912 Jones reported finding this organism in a fatal outbreak of disease in adult fowls. Since Jones reported his findings it has become a well established fact that young chicks which have recovered from this disease may harbor the germ and when mature transmit it through their eggs as adult fowls.

Because of the similarity to a certain extent of the morbid anatomy in the disease caused by *Bacterium sanguinarium* and that produced by *Bacterium pullorum* in adult fowls, we give below a comparison of the morphology, cultural, biochemic properties, and the resistance of the two organisms:

	<i>Bacterium sanguinarium</i>	<i>Bacterium Pullorum</i>
<i>Morphology</i>	Rod shaped, 1 to 2 microns in length, ends rounded or pointed. Occurs singly or in pairs.	Rod shaped, average 3.5 microns long, ends round, occurs singly or in pairs.
<i>Staining</i>	Takes a peripheral stain.	Stains uniformly.
<i>Agar Plates</i>	Colonies smooth, round, glistening, 5 to 8 millimeters in diameter, slightly convex, <u>finely granular</u> .	Colonies round, 1 to 2 millimeters in diameter, convex, <u>finely granular</u> .
<i>Agar Slant</i>	Growth vigorous, <u>spreading</u> .	Growth moderate, restricted to needle track.
<i>Gelatin Stab.</i>	Moderate, granular, becoming feathery. Non-liquefying.	Uniform, filiform, non-liquefying.
<i>Potato</i>	Growth moderate, becoming vigorous with age, dark brown color.	Very slight or no growth at all.
<i>Milk</i>	Not coagulated, saponification.	Not coagulated, becoming slightly acid.
<i>Glucose Bouillon</i>	Acid and no gas.	Acid and gas or acid and no gas.
<i>Lactose Bouillon</i>	Remains alkaline. Sediment.	Remains alkaline.
<i>Saccharose Bouillon</i>	Reaction at first neutral becoming alkaline.	Alkaline throughout.
<i>Indol</i>	Indol is not produced.	No indol produced.
<i>Resistance</i>	Killed in 25 minutes by direct sunlight. Killed in 8 minutes by 3% carbolic acid.	Killed in 5 minutes by 1% carbolic acid.

SUMMARY. A careful review of the work done by us during our investigation of this disease would warrant the conclusion that we were dealing with the disease described by Moore in 1895 as Infectious Leukemia, confirmed by Dawson in 1898 and studied as Fowl Typhoid by Curtice in 1902.

We have found that there are certain differences observed by these writers to which we wish to call special attention. Moore states that "diarrhea is not present" while Dawson observed that "there is a profuse diarrhea."

In the same way Dawson describes the organism as "coagulating milk in one day" while Moore announced a "saponification of milk after a period of incubation" and no coagulation.

During our experiments and as described by the owner in the outbreak resulting in the investigation, diarrhea was present in about 80% of the cases. Again, we have found the organism to saponify milk in four to five weeks while no coagulation occurred.

Moore has called attention to the fact that examination of the blood of a diseased fowl, Toisson's fluid being used as a diluting agent, showed that numerous red corpuscles appeared to take the blue stain more or less intensely. Ward in his bulletin on fowl cholera draws attention to certain cells not leucocytes, taking the blue stain and described at some length the morphology of these cells. Undoubtedly Ward was describing what later Warthin designated as "thrombocytes". Burnett has called attention to these cells and describes them as being "undoubtedly the result of degeneration."

During the work just completed on this disease, we wish to corroborate the findings of Moore. In making examinations of the blood of diseased fowls, using Toisson's fluid as a diluent, we have found in every case red cells showing all the characteristics of a normal red blood cell of healthy fowls, except that they were stained more or less intensely blue. As many as nine of these cells have been observed within the 9 sq. mm. ruled space of the Zappert-Ewing counting chamber. The so-called thrombocytes were also noted and comparison as to morphology drawn. We have not found these blue stained red cells in examining the blood of normal fowls.

CONCLUSIONS

A study of the work done by us seems to justify the following conclusions:

1. Fowl typhoid is a specific disease of fowls caused by *Bacterium sanguinarium* occurring sporadically and causing heavy losses among affected flocks; and unless properly investigated may easily be mistaken for fowl cholera because of its high mortality.

2. The specific morbid conditions consist of an enlarged liver containing necrotic areas, an enlarged spleen and a general anemic condition of the serous and mucous membranes together with a marked increase in leucocytes and a corresponding decrease of the red cell content of the blood.

3. The increase in leucocytes seems to be confined to the polymorphonuclear variety.

4. Fat, well conditioned, adult fowls are more susceptible than young, nearly mature growing birds.

5. Birds may contract the disease by the ingestion of pure cultures of *Bacterium sanguinarium*.

6. Birds fed upon the offal of other birds dead of this disease show a mild non-fatal form of the disease tending to recovery.

7. There is evidence that recovery from this mild form produces more or less of an immunity. Further investigation upon this point is needed.

8. The power of some of the red corpuscles of the affected fowls to take the violet stain, when the blood is diluted in Toisson's fluid is especially noticeable in this disease.

9. While the lesions produced in fowls which are infected with *Bacterium sanguinarium* resemble in many respects those produced by *Bacterium pullorum*, and although there is a still closer resemblance in the biological characters of the two organisms, there is enough difference to warrant the conclusion that they are distinctly different diseases.

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ABSTRACT OF DISCUSSION

DR. K. F. MEYER: Through the courtesy of Dr. Haring I was able to autopsy, the following year, some of the fowls from the same flock, and I was able to isolate the same organism and to corroborate his findings. We were vitally interested in this organism from the viewpoint of its relation to the typhoid bacillus and to other organ-

isms, and our work was in progress when a publication appeared in which practically all the conditions which we intended to investigate were already thoroughly discussed, namely, this bacillus of fowl typhoid is closely related to the *Bacillus typhosus*. It is gratifying to find others who support us. We were able to agglutinate this organism very satisfactorily.

In regard to the earlier observers of the organism, although they do not agree in all things, it is nevertheless shown to resemble closely the *Bacillus typhosus*. As Dr. Theobald Smith has pointed out there are typhoid strains. Moore isolated an organism which he thought established leukemia, while Pfeiler and Rehse found a large amount of alkali in the milk. By peptonizing the milk and using sugar, they were able to isolate the typhoid bacillus. Guided by the work of Dr. Theobald Smith and others, my assistant, Dr. Christiansen has conducted some experiments along the line of immunity, and, if I am not mistaken, we have an organism which is highly pathogenic to rabbits. He is therefore proceeding to test rabbits as to their immunity where various typhoid organisms have been used for their immunization. The question arises, is this bacillus responsible in some instances for typhoid-like infections among men? Who knows but that this may be the connecting link in the chain? Dr. Christiansen is making an examination relative to the motility of the bacillus isolated from typhoid cases. Is it not possible that we sometimes look only for the agglutination and sometimes only for the microscopic conglutination, and pass over vital points? Perhaps we have overlooked some of the causes of typhoid which might be traced back to chicken salad and other food products prepared with chicken material, a very important question for human practitioners. Therefore we have taken up the question as to whether or not the typhoid bacillus can exist in the body of a chicken. Dr. Christiansen will give some of his experiments which bear on the question of the relation of the fowl typhoid bacillus with the typhoid bacillus in the human.

DR. CHRISTIANSEN: In the first place, it is not generally supposed that typhoid is able to exist in the body of a chicken. Statements have been made, I believe, as to the length of time required for the body of a chicken, to rid itself of the typhoid. We found that certain strains of typhoid are much more pathogenic in some chickens than in others. Working with the infected strain we found we could recover the typhoid from the blood of a chicken eight hours after inoculation. Furthermore, after nine hours inoculation, the chicken was dead, but whether or not that was due to shock or whether it was due to the toxicity of the typhoid, we are not able to state. Further experiments in this line are now being conducted, namely: we introduced an occlusive sack into the peritoneal cavity of a chicken containing typhoid organism with the hope that possibly the environment would tend to induce or perhaps inhibit the

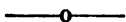
motility of the typhoid strain, in other words, would, if possible, produce a mutation of the typhoid into the fowl organism.

Another interesting observation is that the agglutination of the typhoid or rather the conglutination of the various strains of fowl typhoid differ from ordinary typhoid serum. For instance, we find that a rabbit immunized with the army and navy strain was protected against a lethal dose of fowl typhoid organism.

Still another experiment we have in mind and are now conducting is to determine whether or not certain substances found in a chicken's blood or body tissue, in connection with the temperature of a fowl's body, will produce mutations in the typhoid organism; that is, by growing typhoid organisms, prepared from chicken meat and containing chicken blood at higher temperatures, or at temperatures of the fowl body, if we cannot inhibit the motility of the typhoid or cause it to lose its motility altogether, and increase the agglutinating effects of fowl typhoid serum.

These experiments we hope to have recorded in the near future.

DR. EICHORN. I think it would be of interest to mention the experiments which are now being carried out in the pathology division of the Bureau of Animal Industry in regard to the *Bacillus pullorum* as to its diagnosis in chronic cases. The preparation used is somewhat similar to that for the diagnosis of tuberculosis, but of course it represents only a product of the organism and the intradermal test of a chicken is made and the reaction is somewhat similar to the tubercular reaction in fowls. You are no doubt familiar with the work of Mr. Demas on the effect of intradermal reaction in fowls. The results are not conclusive but are very promising and aim to make possible the determination of the disease in its chronic form when usually the ovaries are affected, and in that way separate the diseased animals from the healthy flock and prevent subsequent infections.



PASTEURIZATION IS NOT A SUBSTITUTE FOR DAIRY HYGIENE*

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The most noticeable development in milk hygiene in the last two or three years has been the growth of sentiment in favor of pasteurization. At one time there was considerable prejudice against pasteurized milk, partly because the process was first used secretly by milk dealers to preserve unclean milk. In the first attempts to make the process really effective in the destruction of harmful

*Presented at the meeting of the Pennsylvania State Veterinary Medical Association, Pittsburgh, Feb. 23, 1916.

bacteria, the milk was exposed momentarily to temperatures sufficiently high to destroy the bacteria immediately. This method is known as the "flash" or continuous process. The degree of heat necessary to make this method effective gives the milk a cooked taste, prevents the cream from rising, renders the milk less digestible by coagulating the albumin, and precipitates the soluble phosphates, the latter change being held responsible for the occurrence of Barlow's disease and rickets in infants nourished on such milk. It also destroys all of the lactic acid bacteria while permitting the spore-forming peptonizers to survive, so that the milk does not sour like raw milk but undergoes putrefaction. The process therefore met with considerable disfavor on both commercial and hygienic grounds. Later, it was found that lower degrees of heat continued for a longer time exert a destructive action upon the harmful bacteria equal to that produced by higher temperatures acting momentarily. At the same time, if the temperature does not exceed certain limits, the milk is not changed in any way and some of the lactic acid bacteria survive. Milk pasteurized by this method, which is known as the "holder" process, was much more favorably received, the distributors being particular to keep the temperature below the point at which the cream line would be affected or a cooked taste produced.

Perhaps the greatest factor in the growth of sentiment in favor of the pasteurization of milk was the approval of the process by the Commission on Milk Standards of the New York Milk Committee in 1912. Another important influence was the fact that pasteurization offered to local health authorities a practicable means of preventing the spread of typhoid fever, diphtheria and scarlet fever through milk. The infection of milk with typhoid bacilli through the use of infected water to wash the milk vessels or through infection carried by returned bottles can be prevented by suitable measures. It is possible also to prevent the direct infection of milk by persons in which typhoid fever, diphtheria or scarlet fever is well-developed, or by persons attending such patients and by convalescents, but there is no certain method of guarding against infection of milk by ambulatory cases and bacilli carriers. Tubercle bacilli are more frequently present in milk than bacilli of typhoid fever and diphtheria or the virus of scarlet fever, but the effects produced by tubercle bacilli do not become apparent for some time after infection and are usually of a mild, chronic type, while the

occurrence of typhoid or diphtheria bacilli or scarlet fever infection in milk is manifested almost immediately and in a pronounced form; a large number of the persons ingesting the milk are affected with an acute disease of a serious character and usually some die. Consequently, the general public as well as health officials is profoundly impressed with the importance of protecting milk from contamination with the infectious agents of these acute infectious diseases.

The approval of pasteurization of milk by the Commission on Milk Standards was qualified by certain requirements; all of which are equally important. It seems to be quite well-known that the Commission stipulated that the milk should be heated to at least 140°F. for not less than 20 minutes and that it provided that the time of exposure can be reduced one minute for each degree the temperature is increased until the temperature reaches 155°F. and the time of exposure is reduced to 5 minutes. But it does not appear to be so well-known that the Commission also laid down certain requirements regarding the cows from which the milk is to be obtained, the conditions under which it is to be produced and the bacterial content before and after pasteurization. For Grade A milk it is required that the herds shall be examined every six months by a qualified veterinarian; that the sanitary conditions and methods shall score at least 65 on the Bureau of Animal Industry score card, and that the milk shall contain not over 200,000 bacteria per c.c. before pasteurization and not more than 10,000 per c.c. at the time of delivery to the consumer. Milk from dairy farms which do not meet these requirements may be sold as Grade B pasteurized milk provided the cows are submitted to a physical examination once a year, and provided also that the bacteria do not exceed 1,000,000 per c.c. before pasteurization and 50,000 per c.c. at the time of delivery, but it is urged that these farms be brought up to the A grade as soon as possible.

These requirements are too important to be overlooked or ignored. The minimum temperature and holding time approved by the Commission is based upon the results of pasteurization experiments made by American investigators with the tubercle bacillus. The tubercle bacillus was used in these tests because an amount of heat sufficient to kill this organism will also kill the bacilli of typhoid fever and diphtheria and the virus of scarlet fever. Russell and Hastings found that tubercle bacilli added to milk from artificial cultures were killed by a temperature of 140°F. in 10 minutes.

Theobald Smith found that tubercle bacilli suspended in physiological salt solution were killed when heated at 140°F. for 15 minutes, while Rosenau found it necessary to heat milk for 20 minutes at 140°F. to kill tubercle bacilli added to it from artificial cultures. These experiments were all made in the laboratory with small quantities of fluid heated in a water bath. Subsequently, Rosenau experimented with artificially infected milk in a commercial pasteurizing plant and came to the conclusion that in commercial pasteurization a temperature of not less than 145°F. for 30 to 45 minutes was necessary to kill tubercle bacilli. The Commission on Milk Standards therefore recommended that in order to allow a margin of safety, milk pasteurized under commercial conditions should be exposed to a temperature of 145°F. for 30 minutes. The experiments of Hewlett, in England, confirmed those of the American investigators. But a number of other European investigators experimenting with naturally infected milk obtained different results. In some of Woodhead's experiments a temperature of 140°F. killed the tubercle bacilli in 25 minutes but in others 8 hours were required. In Foster and Rullmann's experiments, tubercle bacilli remained alive after exposure to a temperature of 140°F. for 45 minutes, while Yersin, Bitter and Bonhoff found that this temperature could not be depended upon to kill tubercle bacilli in less than one hour. The marked differences in the results obtained by the American and European investigators is due to the fact that the former worked with artificially infected milk and the latter used naturally infected milk. In artificially infected milk the bacilli are naked while in naturally infected milk the organisms are embedded in masses of mucus, clots of fibrin or shreds of tissue and this albuminous covering protects them to a certain extent from the action of the heat. On the other hand, the European investigators experimented with milk from individual tuberculous cows whereas in practice milk from such cows is diluted with the milk of cows which are not tuberculous. In neither series of experiments, therefore, did the milk used correspond to infected milk produced under natural conditions. Nevertheless, the number of experiments in which a temperature of 140°F. for 20 or even 30 minutes failed to kill tubercle bacilli, demonstrates that a physical examination of the cows producing milk to be pasteurized is very necessary. An examination of this kind, if properly carried out, will eliminate the cows infected with tuberculosis which are most concerned in infecting milk with tubercle bacilli.

Bacteria which gain access to milk grow and multiply and in their development decompose the milk constituents into various substances, some of which are harmful to the milk consumer; they also form toxins, both endo- and ectotoxins. The extent of this decomposition and the quantity of toxins formed will depend upon the number of bacteria which get into the milk primarily, and the temperature at which the milk is kept. Pasteurization cannot repair the damage done to the milk by the operation of the decomposition processes nor can it destroy all of the toxins. Hence the limitation placed on the number of bacteria permissible in milk to be pasteurized and the requirement that the sanitary conditions and dairy practices on the farms where the milk is produced shall be up to a certain standard.

In an effort to guard against inefficient pasteurization and to insure the prompt and continued cooling of the milk, the number of bacteria which may be present in the milk at the time of delivery is limited to 10,000 per c.c. for grade A and 50,000 for grade B. There is some chance of pasteurized milk being reinfected during cooling and bottling and for this reason pasteurization in the bottle is to be preferred.

Merely heating milk at 140°F. for 20 to 30 minutes is not a substitute for dairy hygiene but is only an additional safeguard against the spread of typhoid fever, diphtheria and scarlet fever through milk.

A NOTE ON THE EXTREME RESISTANCE OF TWO SPORE BEARING MICROORGANISMS

WALLACE V. SMITH

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The spore form of the *Bacillus anthracis* has long been recognized as one of the most resistant forms of micro-organic growth. The organism has been widely used to determine the efficiency of germicides and other destructive agents. The spores will resist drying at least ten or twelve years. They are killed by dry heat in three hours at 140°C., and by steam or boiling H₂O in five to ten minutes, although some resist for much longer periods. A ten per cent solution of creolin does not kill the spores and they are able to main-

tain their vitality in a sixty per cent solution.* The spores of the *Bacillus anthracis* in a dried state and in the presence of albuminous matter, such as blood, will tolerate a temperature above 100°C., and resist the action of absolute alcohol, of compressed oxygen, complete absence of oxygen, exposure to sunlight, etc.**

In the Animal Husbandry laboratory of the Kentucky Agricultural Experiment Station, a culture of *Bacillus anthracis* was desired on short notice. At the time, there were no cultures of the bacillus on hand. There was, however, a slide on the cover glass of which a stain of the organism had been made from a pure culture nine years previously. This slide on being viewed under the microscope showed both vegetative and spore bearing organisms. The organism had been fixed on the cover glass with heat as per the usual technique and stained with plain fuchsin stain. The stain which originally was deep red was not very deep in color when viewed at this time. This was also an indication of its age. The cover glass had been mounted in Canada balsam. .

The exterior of the slide was washed thoroughly with alcohol. The slide was immersed in warm sterile water for several hours to loosen the cover glass. The cover glass was broken while attempting to remove it from the slide, and the broken pieces were placed directly in plain bouillon. After having been incubated for the usual length of time, a luxuriant growth appeared in the bouillon which upon examination proved to be a pure culture of the *Bacillus anthracis*. Thus, after having been subjected to a severe direct flame (in fixing on the cover glass), after having remained in contact with the fuchsin stain and Canada balsam for nine years, without oxygen, the spores being brought under favorable conditions grew readily and luxuriantly.

The *Bacillus subtilis* is very closely related to the *Bacillus anthracis*. The spore form of *Bacillus subtilis* is more resistant to heat than the spore form of *Bacillus anthracis*. The importance of thorough sterilization of linen when used in special cases and the care with which the sterilization is done should be emphasized. A hanging drop slide was partly filled with agar culture of *Bacillus subtilis* which showed spores. This slide was wrapped with six small hand towels and placed in the hot air sterilizer. The steri-

*General Bacteriology, Edwin O. Jordan, p. 226.

**Practical Bacteriology, Microbiology and Serum Therapy, A. Besson, p. 526.

lizer was heated to 175°C., and the thermometer ranged from 175° to 200°C. for two and one-half hours. The heat was so great as to char the exterior of the roll of towels. After allowing the sterilizer to cool, the bundle was removed and the slide taken out. A blister was burned on an assistant's hand in removing the slide. Some of the crisp, hard culture was removed from the slide and transferred to plain bouillon tubes and plain agar slants. After twelve hours incubation, a very heavy growth was obtained in each case, which completely covered the agar slants and clouded the bouillon medium.

The two cases mentioned above are concrete cases of the very great resistance of spore bearing organisms and should emphasize the importance of using care in the handling of pathogenic organisms of this type.

VACCINATIONS AGAINST HEMORRHAGIC SEPTICEMIA*

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One of the diseases which annually causes considerable loss to stock owners and which according to some reports seems to be increasing, is hemorrhagic septicemia. This disease may occur anywhere especially during summer, either sporadically or enzootically and appears to be more prevalent in especially rainy seasons which are followed by hot weather and which is especially favorable for the growth of rank vegetation.

Cattle on mountain pastures or on pastures in which swampy land gives rise to this rank growth are apparently more often affected than are animals which graze over well cultivated areas. It is not our purpose to incorporate in this paper a history of the disease, giving its symptoms, anatomical changes, diagnosis, etc., but to set forth briefly some experiments which have recently been conducted; with the idea of eventually arriving at some form of treatment which will give veterinarians who have until within the past few years been unable to successfully cope with the disease, something which may prove of value in its control.

*A brief summary of this paper was given at the Pennsylvania State Veterinary Medical Association Meeting, Pittsburgh, Pa., February 23, 1916.

In December, 1912, Mohler and Eichhorn reported on some work done in immunizing the buffalo herd in Yellowstone Park against hemorrhagic septicemia. One year prior to that date these animals were reported as dying, and autopsies with subsequent bacteriological investigations revealed the presence of *B. bipolaris bubalisepticus* and established the identity of the disease.

For their work two vaccines were used, the first being prepared by growing the organism five days at 42.5°C., while the vaccine for the second vaccination was attenuated at the same temperature but for only two days. Different preparations of these vaccines after being tested thoroughly on laboratory animals and on sheep were used subcutaneously in the amount of 1 c.c. to the dose. During their experimental work at the laboratories these men also demonstrated by means of the complement-fixation test that vaccinated animals responded after vaccination with the production of immune bodies and reactions were noted even three months following these vaccinations. At the time they reported these experiments, i.e., one year later, there had been no indications of a recurrence of the disease among the buffalo. In March, 1914, Dr. R. R. Clark of Hampton, Va. reported favorably on results obtained by him in controlling the disease with a similar vaccine prepared by the Bureau.

With this information at hand it was decided to undertake the vaccination of herds in Pennsylvania from which we had reports by different veterinarians as to the extent of the disease. During the experimental work at the Laboratory of the Pennsylvania State Livestock Sanitary Board for the past two or three years it was found that strains of *B. bovissepticus* recently isolated and grown for but one generation on culture media, while highly virulent for laboratory animals failed to produce anything more than a slight local swelling when injected subcutaneously in 1 to 2 c.c. doses into calves two to three months of age. This experiment followed previous work done in the attempt to attenuate our strains for vaccination purposes at five and two days with a temperature of 42.5°C. as outlined by Mohler and Eichhorn.

In these experiments vaccine No. 1, grown at 42.5°C. for five days and inoculated subcutaneously into a rabbit in the amount of 0.2 c.c. caused the death of the animal in three days with characteristic lesions of hemorrhagic septicemia. The same vaccine was continued at this temperature, and rabbits injected daily with the same dose, with the result that they continued to die up to and in-

cluding the seventeenth day, after which injections were discontinued. Three attempts to attenuate strains of *B. bovissepticus* failed as we were not successful in so reducing the virulence of the strains that rabbits did not succumb to the disease when injected subcutaneously with 0.2 c.cm. The rabbits injected with this amount of a vaccine incubated for seventeen days also died on the third day following the injections, with typical lesions of hemorrhagic septicemia.

Having demonstrated that 48-hour cultures of the organism were not virulent for calves when injected in small doses, although killing rabbits in from 18 to 24 hours, it was therefore decided to use a similar culture as a vaccine with the idea that such a vaccine should give a greater and more lasting immunity. The vaccine was prepared as follows:—Approximately 100 c.c. of glycerin bouillon was inoculated with one loopful of a strain of *B. bovissepticus*, the flasks placed in the incubator and grown at 37.5°C. for 48 hours, being shaken every 12–14 hours to insure equal distribution of growth. At the end of this time it was placed in sterile, rubber-stoppered, amber colored glass bottles, ready for shipment with instructions to use 1 c.cm. subcutaneously for cattle and 0.5 c.cm. for sheep. Several veterinarians thoroughly familiar with hemorrhagic septicemia were forwarded the material. The following table shows the number of herds and the number of animals in each herd which were vaccinated:

TABLE

Herd Number	Species	Number of animals in herd	Number dead prior to vaccination	Number sick at time of vaccination	Number vaccinated	Date of vaccination	Number dead following vaccination	Healthy animals to date
1	Cattle	170	30	3	140	9-14-15	5	135
2	Cattle	36	2	0	34	9-20-15	0	34
3	Cattle	31	4	0	27	9-21-15	0	27
	Sheep	74	0	0	74	9-21-15	0	74
4	Cattle	43	3	0	40	10- 2-15	0	40
5	Cattle	35	1	1	34	10- 4-15	0	34
6	Cattle	44	0	0	44	10- 4-15	0	44
7	Cattle	24	0	0	24	10- 5-15	0	24
8	Cattle	19	2	2	17	1- 5-16	0	17
9	Cattle	46	1	0	0	.....	0	45
10	Cattle	20	0	1	0	.....	0	20
11	Cattle	18	0	1	0	.....	.	18
12	Cattle	40	7	0	0	.....	.	33

Dose for cattle 1 c.c., Sheep 0.5 c.c. subcutaneously.

Herd No. 1, of 170 animals was pastured on a mountain pasture of several hundred acres in which was a swampy area recently cut over by lumbermen and which showed plenty of rank vegetation. Thirty animals had died prior to vaccination, three were showing clinical symptoms when vaccinated and five died following the vaccination, including the three which were sick. It is not unlikely that had temperatures been taken the other two animals which died would have showed increased temperatures. This was the only herd in which any deaths followed the vaccination; although in herds No. 5 and No. 12 three sick animals were injected.

In herds No. 2, No. 3, No. 4 and No. 5, the disease was immediately checked without further losses.

Herds No. 6 and No. 7 were on farms adjoining that of No. 5 and were given the vaccine as a prophylactic against the disease.

In herd No. 8 the outbreak was checked and the sick animals recovered following the vaccination.

One animal only was sick and died in herd No. 9.

In herds No. 10 and No. 11 a sick animal in each case was treated with iodine internally and both recovered. No further cases developed nor were they vaccinated.

In the case of herd No. 12 the veterinarian made a diagnosis of anthrax and they were vaccinated for the same, but the deaths continued and the second veterinarian was called and found a typical case of hemorrhagic septicemia. Seven young heifers in the pasture where seven others had died, were sold. No further cases developed nor were they vaccinated. The reports in connection with this herd were incomplete and did not show whether the remaining animals on this farm were exposed to the infection.

In summarizing we find that the total number of animals in the infected herds that were vaccinated was 476; number of animals dead prior to vaccination 42; number of animals vaccinated 434; number sick at time of vaccination 6; number of deaths following vaccination 5; leaving a total of 429 healthy at the present time.

It is to be regretted that the last four herds not vaccinated and used as control herds did not develop the disease to a greater extent. This may be due to a mistaken diagnosis or they may simply have been sporadic cases,—probably the latter. Meyer believes that a clinical diagnosis is extremely difficult and depends upon autopsies and bacteriological findings. In the case of but two herds only did we have specimens submitted for a bacteriological

examination. The others were confirmed by autopsists familiar with the disease.

The herds will be watched during the coming summer for any new cases which may occur and other experiments undertaken in order to further perfect these vaccines and establish if possible the relative values of the immunity conferred.

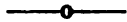
CONCLUSIONS

The use of 48-hour cultures of *B. bovisepiticus* subcutaneously in the dose of 0.5 c.cm. for sheep and 1 c.cm. for cattle is harmless.

The immunity conferred by this vaccination has not been thoroughly demonstrated, but the sudden checking of losses in several herds may be evidence of some value.

Incubation at 42.5°C. for seventeen days failed to render the strains avirulent for rabbits in the dose of 0.2 c.m.*

*We are indebted to Drs. Super, Dick, Barnes, and Mitterling for the hearty cooperation and records furnished in connection with this work.



THE CHANGED STATUS OF THE HORSE IN WAR*

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When the present great war broke out in all its fury, one could hear and read almost everywhere, that this was to be a contest of machines. The *gasoline engine* particularly was to revolutionize the old-fashioned fighting on land by speedily moving men and supplies to the front in automobiles and motor trucks. The picturesque fight in the air by aeroplanes was at once enthusiastically cheered by the excited peoples of the world, both belligerent and neutral. It seemed as if the old and beautiful martial phantoms of despairing soldiers who perceived in the skies angels with flaming swords astride white horses, and leading hosts of armor-clad warriors against the enemy to crush him, were to be superseded by a panorama of wasp-shaped flying machines spitting fire, conveyed by infantry in armored, tomb-like cars and by artillery drawn by awkward tractors, all spreading destruction. At least

*Printed by permission of the Secretary of War, abstracted from Journal of the U. S. Cavalry Association, January, 1916.

such were the cartoons seen in our magazines and daily papers, and they fired the imagination of the uninitiated populace, drawing with them not a few of our less experienced friends in the army.

Reduced to its absurdity, this was to be a horseless war, almost a manless war.

Little of this fantastic idea has come true. No doubt, this war has developed mechanical combat further than ever before, just as it has reverted to methods of fighting long since obsolete. Military critics have pronounced this struggle not as an evolution of warfare, but as a revolution. Whatever truth there may be in this dictum, we may well investigate and weigh some particular topic as presented by this war, that stands out prominently to men of expert knowledge. There are enough of reports on hand, thrown here and there in our military and other professional journals, to warrant an examination of the subject matter of this article, which we shall consider under the following points:

I. The established value of the gasoline driven vehicles for army transportation and their limitations in war.

II. The horse promptly fills the gap left open by the motor car service in this war, and his value increases accordingly.

III. The combatant capacity of the horse is once more established and leads to a new status of his humane protection and economic preservation.

I. *The established value of the gasoline driven vehicles for army transportation and their limitations in war.*

To summarize the first point of this article, the question of mechanical haulage in war, is about as follows: Just as the steam engine is dependent for speed upon a prepared road-bed and steel rails, so the various gasoline driven vehicles can travel only on improved roads and highways. Automobiles, motor ambulances and motor trucks have become valuable auxiliaries in military transportation, because they are able to save time by shortening distances—if favorable conditions prevail. Under unfavorable conditions of weather and roads no motor car can be depended upon for reliable service. They deteriorate rapidly by the undue wear and tear demanded in war service, and they are very vulnerable to missiles. Their usefulness in war, therefore, is restricted to well defined road-beds, beyond which other facilities for transportation must be provided.

II. *The horse promptly fills the gap left open by the motor car service, and his monetary value increases accordingly:*

Numerous reports from the theatre of war clearly state that in order to provide transportation for the endless network of country roads to supply the smaller military units with food and ammunition, the horse drawn wagons, horse carts or pack horses were found to be essential. Occasionally even men carriers had to be employed to supply the high mountain trenches.

Thus it appears as true as ever that man and horse, the two animated machines that have fought side by side since the dawn of mankind, do still supply the only safe means to draw or carry loads over muddy roads, over ploughed fields, through streams, across ditches, hedges, and up mountains. The motor car, an ingenious machine constructed of inorganic parts and wanting sufficient suppleness, was found helpless here.

As regards the comparative traction power of machines and horses, mechanical experts have never ceased to figure this out by mathematics. We prefer to consider this question in the light of results obtained by comparative tests. Professor Henry, University of Wisconsin, has lately made such experiments with agricultural tractors and horses and he very briefly concluded as follows:

“The energy developed by the horse in proportion to the fuel or feed consumed, ranks him very high in comparison with the best modern engines. The horse is a very flexible motor, able to work at varying speeds and to develop an extremely high power for a short time if occasion requires. The ‘motor with the brains’ shows a much higher rate of efficiency than the horse power developed would indicate.

Much has also been said by the favorites of the new machines about the great mortality of horses in this war; yet war has always killed men and horses and destroyed all kinds of equipment of the adversary because that is its purpose. The report going through some dailies that two million horses had been killed on the western front can only be judged as a wild speculation. In December, 1914, a French statistician, taking in all the figures made public during the first six months of the war, computed in the *Figaro* that the average life of a man in this war is *six and five-sixths* days, and that of a horse *four and one-third* days; aeroplanes and automobiles lasted *three* days, and motor trucks less than *one* day. While these data were perhaps correct for the first rush of the armies, against

each other in open fields, they are undoubtedly too high and subject to revision after the termination of the war. Still, they may indicate the comparative losses of men, horses and machines as unfavorable for the latter.

There is much rejoicing among interested parties about the exportation of so many horses to Europe. The deal is being looked upon as a good business, particularly as we are told by our government officials, that there are left today in the United States, approximately 21,000,000 horses and 4,000,000 mules; but again numbers do not tell the truth as far as the interest of our army is concerned. Only a comparatively small number of the millions of animals would be found to be serviceable in case of need. About half of this number consists of immature horses and of aged horses, and the rest would show a preponderance of the heavy draught breeds in our fertile agricultural districts. Among the light and active breeds of horses great numbers are unfit and unsound, and these always glut our markets or are retained on the poorer farms and ranches. Our horse breeders believe, that the horses exported were of *medium class only*, and the horse dealers acclaim that prices for *ordinary horses, such as the army consumes*, have correspondingly increased. That is as far as breeders and dealers can see. Worst of all, from the army standpoint, little is made in our stock papers of the fact that we have now on hand over a hundred thousand horses rejected by the foreign buyers. Any officer, who has served on a horse purchasing board, knows that such rejects are utterly valueless. Yet we must retain and absorb them, and the rejected mares will produce that many more worthless horses.

Whatever may be the ultimate result of the exportation of so many horses, more or less suitable for our own army, we should remember that the United States exported only 109,839 horses and 81,524 mules during nearly three years of hostilities of the Boer War, and that ever since we have experienced difficulty in procuring suitable horses for our cavalry. That horses will price much higher is certain, and horse breeders already predict that, if the exportation of horses to Europe continues for a year or more, army horses will be worth \$250 to \$300, as they were toward the end of the Civil War.

III. *The combat capacity of the horse is once more established and leads to a new status of his humane protection and economic preservation:*

The foreign governments importing our horses for the need of war, may or may not have especially considered the \$130,000,000, or more expended for this purchase. Judging from foreign press comments, however, the armies at war realized again the old value of the horse as a combatant factor, otherwise the strenuous efforts to secure sufficient numbers of serviceable horses cannot be explained. A letter by an American with the British army states:

"After making a study of horses and motor cars in this war, I am of the opinion that horses, even though erratic, may be depended upon to a greater extent than motor vehicles and have proved their worth in this war. Having seen horses in action with the Royal Field Artillery of England, it seems that the horses have more brains than some of the men controlling them. They stand still where their mates have been wounded or killed, while under similar circumstances men lost their heads. In rushing over a battlefield a horse will never step upon a wounded or dying man. I heard this before, but did not believe it until I saw it myself."

A German officer expressed himself to an American reporter as follows:

"The horse is absolutely necessary at the front to haul heavy ordnance into position. Our tractors are excellent, but we keep now always horses in reserve. While I have seen horses trembling from the smell of blood or the sight of other horses disemboweled and writhing in agony on the ground, those in harness kept enough will power and courage to perform the heaviest work with the utmost assistance to the men. I am not a horseman, but I have learned to respect the horse for his behavior in this war, and they are treated by us as comrades."

This old truth apparently learned anew in this war, must have been one of the reasons of the sweeping change made by all the belligerent armies, one after the other, for the preservation of horses. The great armies of Europe, well organized as they are in the smallest branches of the service, have always expended considerable effort to protect horses from the ravages of war. Yet, never before has any army adopted such painstaking methods, or applied so thoroughly practical arrangements for the care and prompt treatment of wounded horses than in this war.

It is interesting to note how this new care of the horse in war has indirectly been brought about by the influence of humane societies. Always present and persistent in their laudable endeavors,

they promptly offered their assistance in the care of wounded horses on the battlefield. Of course, horrible tales of suffering of horses had come to their knowledge. An American woman, Clara Barton, admired the world over, contributed perhaps not a little to this new work of mercy in war, for a letter written by her several years ago, was quoted abroad as follows:

"I have often said, that among the shocking and heartrending scenes on the battlefield, the screams of wounded horses lingered more painfully in my ears, if possible, than the moans of wounded men. I think it is necessary that the veterinary surgeon is commissioned to follow the army and put an end to the agonies of the poor, wounded animals which from their great vitality and strength will live long to suffer. They die slow and hard if left to themselves, and I myself have seen the vultures hovering over and tearing at them while life yet remained."

As now constituted, the arrangement for the care of wounded horses on the British—French front, reported by English Veterinary Journals, is as follows: The British army maintains *Mobile Veterinary Sections* for the purpose of relieving field units of wounded and inefficient animals. One mobile section is attached to each division and to each cavalry brigade, and consists of one officer and twenty-two enlisted men of the Army Veterinary Corps, mounted and equipped for emergency treatment. This section is controlled by a senior Veterinary officer serving at Division Headquarters, and is divided into two sub-sections, each with the following duties:

Sub-section I. Collects the wounded horses from the line of battle and applies such first aid as circumstances may permit, or destroys seriously wounded horses.

Sub-section II. Conveys the unfit horses by leading or by horse ambulances to the nearest railroad station, and thence to the *Advance Veterinary Hospital*.

There are ten hospitals in operation, located along the lines of communication. Those nearest to the front are designated as *Advance Veterinary Hospitals*, and they are only fitted for about one hundred cases. Horses received here are sorted according to the severity of wounds. Those needing prolonged or special treatment are transported to one of the *Base Veterinary Hospitals* with a capacity for about one thousand cases. From the Base Hospital such horses as have fully recovered are discharged to the Remount Depot for reassignment to troops, while those needing further re-

cuperation are sent to the Convalescent Horse Depot, location not given, but which is reported to cover an area of twenty miles, provided with pastures and sheltered paddocks.

The personnel of the British Army Veterinary Corps, which is performing such fruitful services at the front, is constituted as follows, according to Royal Warrant, dated October 9, 1903:

One Major General, Director Army Veterinary Corps, two Colonels, ten Lieutenant Colonels, twenty-three Majors, forty-seven Captains, sixty Lieutenants, a total of 143 Veterinary officers. There is also an enlisted force consisting of non-commissioned officers and men, graded as staff-farrier-sergeant, farrier-quarter-master-sergeants, farrier-sergeants, shoeing-smith corporal, shoeing-smith privates. There are also organized Territorial Army Veterinary Corps for Canada, India, Australia and Egypt, which have sent mobile veterinary sections to the various British fronts.

The arrangements for the care of wounded horses of the French Army are not as well known as that of the British. There appears to have been less preparation in the French Army in this respect at the beginning of the war, but this has been rectified as far as veterinary hospital accommodations are concerned, by the assistance of the Blue Cross Society, which is a branch of *Our Dumb Animal League* of London. A large convalescent station for about two thousand disabled horses has been established at Chantilly, from which cured and recuperated horses are returned to the front as needed.

The German Army originally mobilized 1,230,000 horses but owing to the gigantic scale assumed by the Russo-German campaign, this strength was raised to 1,830,000 horses. There have been great cavalry movements over the plains of the Eastern front, and the use of motor trucks on the unimproved roads in Poland is impracticable except for a brief time in summer. The use of aeroplanes is limited on account of the stationary fogs during fall, winter and spring, and cavalry scouting had to be resumed on a large scale. Each German Army Corps has 30,000 horses in war strength; a cavalry division about 7,000 horses. The value of a cavalry horse before the war was 1,500 marks (about \$300).

According to the *Berlin Veterinary Weekly*, each Army Corps is provided with one horse hospital (Pferde-Lazaret) and two Horse Depots. The regulations prescribing the administration and work of these hospitals are as follows:

- I. The horse-lazaret is a collecting station for wounded or

unfit horses and a dressing station. It is to hold itself mobile and for this purpose is attached to the first étape. (Gefechtsaffel). It is flying the red-star flag for the orientation of those needing its help.

II. The protection of wounded horses is the regulation shelter, or evacuated and disinfected stables or barns, as circumstances may permit. (The movable regulation or shelter consists of prepared piping, screwed together by joints, with canvas roof and curtains to windward. O. S.)

III. Horses quickly cured in the lazaret and serviceable are returned to their organizations. Seriously wounded horses in agony and incurable cases are destroyed. The corpses are burned or buried well off the lines of communication.

IV. Wounded or sick horses requiring more than three weeks of treatment are conveyed to the Horse Depots, which serve as Veterinary Hospitals and Remount grading section combined. The housing of the Depots is to be found in evacuated army stables of occupied cities having railroad facilities if possible. Horses cured and further serviceable are reissued to the troops; those recovered but unfit for further field service are condemned and so branded. They are transported home, mares to be sold to farmers, the rest to traders.

V. Veterinary officers in charge will make running reports to the Corps Staff Veterinarians of the number of horses treated, recovered, reissued, destroyed or transported home for sale.

VI. Utmost diligence is enjoined to preserve the horse supply in reserve at the Depots. The assistance of the Animal Protective Societies (*Thierschutz-Verein*) has been most liberal in furnishing moneys or supplies of woolen horse blankets for winter camps, and many kinds of medicines and dressing that could not be obtained in the occupied territories. In Jena even a hospital for invalid war dogs has been instituted, of which more than 1,500 are employed by the Hospital Corps in searching for wounded soldiers. The tendency of the military authorities is to let all this good work go on to its fullest extent.

The loss of German Army horses during the first six months of the war has been 9 and 91/100 percent. most of it traceable to the great destruction wrought by artillery fire, which has been often specially referred to in reports; yet this loss is less than in former wars, and it is explained by the painstaking professional care of

wounded and unfit horses in the field hospitals, as no saving of life of horses is authorized to officers of mounted contingents while on forward marches on the battlefield.

The number of horses mobilized by the Austro-Hungarian army has been unofficially estimated as one million, and this number also has been considerably increased during the war by recruiting from the listed horses. From the *Central Veterinary Journal* Vienna, it is learned that each army corps is provided with three field hospitals (Feldspital für Pferde.) One of these is an advance section, following the battle lines, the other two are of a more stationary character. Several large convalescent depots are located in the plains of Hungary, where over 10,000 horses were kept for recuperation during the summer of 1915.

The *Animal Protective Societies* of Vienna and Budapest have been very active in collecting and forwarding warm horse covers, flannel bandages and other horse protecting equipments to the front in endeavoring to mitigate the suffering of horses in winter camps.

As regards the care of wounded horses of the other armies at war, nothing definite has come to our notice.

It is a pity, that beside the exalted example of the volunteer work of Humane Societies for the rescue of horses wounded on the battlefield, stands the regrettable fact, that there has been misuse of horses in this war.

One of the brightest and well known captains of the mounted service of our army, recently said to the writer :

"If we take the report as correct that the cavalry on the Western theater of war was practically dismounted within a month, some hard criticism will be heard at the end of this war of the useless attempt to overrun the enemies country with cavalry patrols that lost connection and were bound to be captured; and on the other hand of the adherence to the ancient ethics of dashing charges against unshattered infantry and artillery. If the horses killed by such misuse would have been saved for dismounted cavalry action, the scene on the Western front might look differently."

Extreme hardship to horses is also produced by changed methods of marching. The cavalry is ordered *off the road* and has to ride over ploughed fields to give precedence to the endless caravans of automobiles, motor trucks, ambulances, field artillery batteries, signal corps units, pioneer companies and aeroplane sections.

Continued night marches particularly have resulted in heavy

losses from breakdowns. It is reported by authentic sources that on arrival in camp in the morning, horses were seen to fall asleep so hard that they could not be aroused, a condition of extreme fatigue termed by soldiers *sleeping sickness*. Night marching is also extremely injurious to the hoofs and legs of horses. Artillery horses have been reported as having been for seventy-two hours in harness, the batteries only making enough stops to feed the horses from nose bags. Cavalry horses have been kept under saddle for three days or more to guard against an attack by surprise. It appears that the armies at war are more or less guilty of some form of sinful waste of horses, but for reasons of expediency we omit further details.

We must also omit the discussion of the peculiar injuries and diseases of horses observed in this war, as this subject does not properly come under the scope of this article. It may be briefly mentioned, however, as of general interest, that British Veterinary officers report great trouble with gangrenous wounds caused by the entrance of dirt from certain soils in France, particularly of the Valley of the Aisne. Shrapnel wounds are often fatal on account of tearing of tissue with consequent infection or from the tedious operation of dissecting out large numbers of fragments, as many as forty splinters having been found in a single horse. The greatest trouble to German Army horses on the eastern front are the indigenous lice of Poland, which once contracted are never gotten rid of during a campaign. Numerous outbreaks of glanders have been reported as suppressed from nearly all the fronts, and great vigilance is necessary to prevent the development of an epidemic of this most insidious disease of the horse in war. Anaesthetics are administered in all painful operations in the hospitals, most of the drugs for this purpose being donated by Humane Societies.

In summarizing the second and third points of this article, which explained the reasons for the increased demand of the horse at the front and his changed status in war, the salient features appear to be as follows:

The horse was found to be essential in properly supplying military units which are disconnected with railroad stations and great highways; horse wagons, horse carts and pack horses remain the surest and most economic means of transportation available on country roads, in hilly sections, and during the seasons of fall,

winter and spring. The need of artillery horses, train horses, riding horses and pack mules became so urgent after a few months of hostilities, that British and French government agents purchased in this country half a million horses and mules at a cost to the foreign governments of approximately \$130,000,000 which took away from us a large number of horses more or less fit for our own army.

The combatant capacity of the horse, revealed once more by his willing conduct under fire, leads to a methodical veterinary care of those wounded and unfit, with results appreciated as humane and economic. The saving of lives of horses is accomplished by emergency care performed by mounted veterinary sections following the battle lines; by mobile veterinary field hospitals and by stationary convalescent horse depots. The Animal Protective Societies of the various belligerent countries have received governmental permission to collect funds and supplies for the care of wounded and unfit army horses, and their assistance is now appreciated by army authorities.

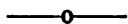
In conclusion it may be stated that the results obtained in this highly methodical care of wounded horses in war, appears to be fully appreciated by the foreign governments concerned, if public utterances of high officials are accepted as testimony. For instance, Lord Lonsdale, after visiting the front on a tour of inspection expressed himself on this subject as follows:

"I think it is only due to all those in the Veterinary Department and the Remount Department to express the extraordinary energy, the love of the animal, the time, hard work, and forethought displayed by all those connected with these two departments. It certainly was a surprise to me, and I went into every detail, and had every facility granted me, and saw every horse, and I do think that we should be not only satisfied, but most grateful to all officers concerned."

This and other similar reports have had the result of lessening the fear and horror of sympathetic people about the reported suffering of horses in war, and they have also led to a due realization of the value of the saving of the great numbers of trained and valuable horses that otherwise would have been lost to the armies.

Impartial reflection, however, must convince our officers to whom such methodical care of disabled horses is novel, that it depends upon a properly functioning Veterinary Service. Such we never had ourselves owing to inadequate support from the army and

Congress. We cannot plead for the extension of such efficient professional care of disabled horses to our army, unless we obtain an expert Veterinary Branch, that is permitted to work seriously and fulfill its beneficent mission. This is by right humane in its tendency and economic in its effect, as has been exemplified by the new status bestowed upon the horse in this latest and greatest of conflicts, which is rocking the civilized world to its very foundation, spreading unspeakable pain, but also producing sublime fortitude and lofty acts towards men and animals.



EXAMINING BOARDS*

THOMAS E. MALONEY, Fall River, Mass.
E. W. BABSON, Gloucester, Mass.

The work allotted to your committee, by vote at the joint meeting of Veterinary College Faculties and Examining Boards of North America, held in New York City during the Fiftieth Annual Meeting of the American Veterinary Medical Association, September 1st to 5th, 1913, was to inquire into the methods and practices of Veterinary Examining Boards in the several states and the scope and character of education given at the veterinary colleges of North America. From the information gathered we were directed to present a report embodying a plan for standardizing veterinary examinations, which shall determine the qualifications of persons to practice veterinary medicine in all of the states of North America.

The committee wishes it to be understood that it purposely refrains from discussing in this report information received from college faculties and examining boards. We believe that the purpose of our appointment will be best served by presenting an arbitrary plan for the conduct of Veterinary Examining Boards, which we submit for your consideration and discussion, as follows:

FIRST. A form of a law, which may be adopted by every state is here with presented. See pages 72 to 75.

The enactment of a uniform law by all states is a very important and necessary step in forming a standard for state veterinary

*Report of the Committee on Examining Boards of the Association of Veterinary Faculties and Examining Boards, Oakland, Cal., September, 1915.

examinations; because every board is limited in its work by the law under which it operates, it therefore follows, that if every board conducts its work under the same law it will be practicable to establish a standard uniform method of determining the qualifications of persons to practice veterinary medicine in all of the states.

SECOND. The character and scope of veterinary examinations shall be the same in every state. The method of conducting, judging and marking examinations, and examination papers, shall be the same in every state.

The subjects in which candidates are to be examined shall be sufficiently comprehensive to cover the entire field of veterinary science, and they shall be limited as detailed in table on page 76. The number of questions which may be asked in a given subject and its sub-divisions shall be limited as detailed in table on page 76.

A prescribed method of judging and marking examinations and examination papers shall be adopted and followed by examining boards in every state. See table on page 76.

The principle to be applied in state veterinary examinations is that a person applying for the privilege of practicing veterinary medicine shall be given reasonable opportunity to demonstrate that he has a competent knowledge of veterinary science and that such demonstration shall be fairly judged.

Veterinary science is divisible into essential and supplementary studies; the essential studies being the important ones should be given greater weight in determining the character of the knowledge presented by the applicant.

The following form (see page 76) is designed to show the scope, division of subjects, relative value of division and method of marking. It is suggested that this schedule be revised by a committee appointed by the Association of Veterinary Examining Boards of North America and reported biennially to the American Veterinary Medical Association for publication.

THIRD. A standard form of reports, application blanks, registration certificates, examination books, and stationery shall be adopted. Forms for same are herewith presented. See pages 77 to 84.

The work of compiling and filing reports and documents for record, reference and exchange will be greatly facilitated if all are of a uniform size and character. It is to be noted that this report and all forms submitted are of a size which we find used by most states for their public documents, and we recommend their adoption, i. e., $5\frac{3}{4}" \times 9\frac{1}{8}"$ and $8" \times 10\frac{1}{2}"$.

In presenting this outline as a standard for the conduct of state veterinary examining boards the committee does not assume that it is perfect. We believe that in presenting as our report a concrete subject for discussion the desired end, namely, "standardizing veterinary examinations," will be sooner and more satisfactorily attained.

We suggest that each proposition in the outline be discussed separately and after such changes and modifications as may seem necessary have been made it be re-drafted, and copies submitted to every examining board for their consideration, and that they be requested to suggest such changes as they may think proper and return it to the chairman of this committee on Veterinary Education and Admission to Registration, of the Association of Veterinary Examining Boards of North America, who shall re-draft it according to the changes suggested and present it at the next annual joint meeting of the College Faculties and State Examining Boards for further consideration and possible adoption or to take such action as it may.

It is further suggested that each board be requested to submit the form of law presented to its respective state's legal department to consider and suggest such changes as will permit its adoption in that state.

Respectfully submitted,

THOMAS E. MALONEY,
ELMER W. BABSON.

I

LAW RELATING TO THE REGISTRATION OF VETERINARIANS

Chapter ———, Acts of ———.

AN ACT TO PROVIDE FOR ESTABLISHING A BOARD OF REGISTRATION IN VETERINARY MEDICINE

Be it enacted, etc., as follows:

SECTION 1. The governor, with the advice and consent of the council, shall appoint five veterinarians, residents of this
.....and graduates of a school of veterinary medicine recognized by the American Veterinary Medical Association, who shall constitute a board of registration in veterinary medicine. Their terms of office shall begin on the first day of January in the year....., and they shall hold office, one for one year, one for two years, one for three years, one for four years and one for five years, or until

their successors are appointed; and the governor shall appoint annually thereafter, before the first day of December, beginning with the year, one veterinarian, qualified as aforesaid, who shall hold office for five years from the first day of January next ensuing. Any member of said board may be removed from office for cause by the governor, with the advice and consent of the council. The members of the board shall receive a salary of \$. a year, and their necessary traveling and contingent expenses actually incurred in attending meetings of the board. The secretary shall receive an additional salary of \$. a year, and his necessary traveling and contingent expenses, not exceeding the sum of \$. actually incurred in attending to the necessary work of the board. The said salary and expenses shall be paid out of the treasury of the

SECTION 2. The members of said board shall meet on the second Tuesday of January in each year, at such time and place as they shall determine, and shall immediately proceed to organize by electing a chairman and a secretary, who shall hold their respective offices for a term of one year. Said board shall hold regular meetings on the first Tuesday of March, July and November of each year, and such additional meetings at such times and places as they may determine. Said board may make by-laws and rules not inconsistent with law necessary to carry out the provisions of this act.

SECTION 3. Said board shall notify all persons practicing veterinary medicine in this, of the provisions of this act by publishing the same in one or more newspapers in this, and every such person who is a graduate of a recognized school of veterinary medicine, and also every person who has been a practitioner of veterinary medicine in this for a period of three years next prior to the passage of this act, shall, upon the payment of a fee of \$., be entitled to registration, and said board shall issue to him a certificate thereof signed by its chairman and secretary. Registration under the provisions of this section shall cease on the first day of in the year All applications for registration under this act shall be made upon blanks furnished by the board, and shall be signed and sworn to by the applicant.

SECTION 4. Any person not entitled to registration as aforesaid who is twenty-one years of age shall, upon the payment of a fee of \$., be entitled to examination, and if found qualified by the board shall be registered and shall receive a certificate of registration as provided in section three. Any person who fails to pass a satisfactory examination and is therefore refused registration may be re-examined at any regular meeting of the board within two years of the time of such refusal, without additional fee, and thereafter may be examined at any regular meeting upon the payment of a fee of \$. for each examination.

The fees received for examination and registration of applicants before the board shall be paid monthly by the secretary of the board into the treasury of the Said board, after a hearing, may by unanimous vote revoke any certificate issued by it and cancel the registration of any veterinarian who has been convicted of a felony or crime in the practice of his profession.

SECTION 5. Examinations shall be wholly or in part in writing in the English language, and shall be of a scientific and practical character. They shall include the subjects of anatomy, physiology, pathology, diagnosis and practice, surgery, obstetrics, materia medica and therapeutics, bacteriology, laboratory diagnosis, animal parasites and veterinary dentistry, and shall be sufficiently thorough to test the applicant's fitness to practice veterinary medicine.

SECTION 6. The board may establish, with the advice and consent of the governor and council, reciprocal relations with a similar board in any state of North America by unanimous vote and agreement of both boards. Any person applying for registration in veterinary medicine in this, who shall present to this board a certificate of registration, issued by a board with whom this board has established reciprocal relations, accompanied by a fee of \$....., shall, by a majority vote of this board register said applicant without examination, provided however, he shall comply with all other requirements and provisions of the law relating to registration of veterinarians. Chapter, acts of and amendments thereof.

SECTION 7. It shall be the duty of said board to keep a register of all practitioners qualified under this act, which shall be open to public inspection, and to make an annual report to the governor.

SECTION 8. It shall be unlawful after the day of in the year for any person to practice veterinary medicine, or any branch thereof, in this who does not hold a certificate issued by said board.

SECTION 9. The words "veterinary medicine," as used in this act, shall be construed to include the practice, or diagnosis and practice of veterinary medicine, veterinary surgery and veterinary dentistry in regard to any domestic animal.

SECTION 10. Any person not registered as provided by this act who holds himself out as a practitioner of veterinary medicine, or practices, or attempts to practice veterinary medicine in any of its branches in this, shall for each offense be deemed guilty of a misdemeanor, and shall upon conviction thereof be punished by a fine of not less than dollars or by imprisonment for a term not exceeding two months, or by both such fine and imprisonment.

SECTION 11. Said board shall investigate all complaints of the violation of the provisions of section ten of said chapter., and report the same to the proper prosecuting officers.

SECTION 12. The provisions of this act shall not be construed to prohibit advice or service, in a case of emergency, by a person not entitled to practice veterinary medicine under this act, nor to prohibit farmers from rendering services to their neighbors if they do not hold themselves out as veterinary practitioners under the provisions of this act, and the provisions of sections. (see below) relating to the practice of medicine within the by physicians and surgeons shall, so far as they may be applicable, apply to the practice of veterinary medicine or any branch thereof by veterinarians.

SECTION 13. Except as otherwise provided herein this act shall take effect upon its passage.

COPY OF CHAPTER 76, REVISED LAWS OF MASSACHUSETTS

SECTION 9. The provisions of the preceding sections shall not be held to discriminate against any particular school or system of medicine or to prohibit medical or surgical service in case of emergency, or to prohibit the domestic administration of family medicine. They shall not apply to a commissioned medical officer of the United States army, navy or emergency hospital service in the performance of his official duty; to a physician or surgeon from another state who is a legal practitioner in the state in which he resides, when in actual consultation with a legal practitioner of this; to a physician or surgeon residing in another state and legally qualified to practice therein, whose general practice extends to the border towns of this if such physician does not open an office or designate a place in such town where he may meet patients or receive calls; to a physician authorized to practice medicine in another state when he is called as a family physician to attend a person temporarily abiding in this; nor a registered pharmacist in prescribing gratuitously, an osteopathist, pharmacist, clairvoyant or person practicing hypnotism, magnetic healing, mind cure, massage, Christian Science, or a cosmopathic method of healing; if they do not violate any of the provisions of section ten.

II

NOTICE

The Association of Veterinary Examining Boards of North America (to be established) has adopted the following schedule of subjects in which candidates for registration in veterinary medicine shall be examined to determine their qualifications:

This board has accepted said schedule and all applicants for registration in veterinary medicine in this state will be examined accordingly.

Weight Per Cent		Time Allowed
30	Anatomy and Physiology	Anatomy Histology Zoology Physiology Hygiene Embryology Three hours
25	Pathology and Laboratory Diagnosis	Pathology Bacteriology Parasitology Meat Inspection Milk Analysis Urine Analysis Three hours
15	Materia Medica and Therapeutics	Drugs Biological products Pharmacology Toxicology Mechanics Physical Forces Three hours
15	Diagnosis and Practice	Sporadic Diseases Contagious Diseases Sanitation Zootechnics Three hours
15	Surgery and Obstetrics	Surgery Obstetrics Dentistry Control and restraint Three hours
Total 100		

Seventy per cent. of total weights are necessary to pass for registration.

Each question shall be marked on a scale of 0-100. The average marks given equals the percentage of weight obtained in each general division.

III
STATE

STATE) BOARD OF REGISTRATION IN VETERINARY
SEAL) MEDICINE

Office of the Secretary.

Member
Member
Member
Member
Member

Chairman
Secretary

.....19...

To.....

My dear sir:

Will you kindly give me such information as you can regarding the claim of of to have been a practitioner of veterinary medicine in this state continuously for a period of three years prior to the passage of the act establishing this Board, to wit:..... day of 19.....

Answers to the following questions and such other information as you may furnish, will be appreciated and treated confidentially.

Yours very truly,

.....Secretary.

PLEASE ANSWER ON THIS SHEET

On the day of19.....

Was he then a resident of your town?.....

Did he then have an office there?.....

Did he then have an office elsewhere?.....

Was he then generally known as a practitioner of veterinary medicine?

Did you know him as such?.....

Has he continued in practice since then?.....

How long to your personal knowledge has he been a practitioner of veterinary medicine in this state?.....

Has he engaged in any other business?.....

The above information is furnished by.....of.....

Date.....

IV

FORM A.

A fee of \$.....must accompany application

Application No.....19....

Received19....

Registered19....

Approved19....

Rejected19....

APPLICATION FOR REGISTRATION IN VETERINARY MEDICINE

Town or City.....State.....19....

To the Board of Registration in Veterinary Medicine:

I, of
(Write full name, do not use initials)

a graduate of a recognized school of veterinary medicine, having
power to confer degrees in veterinary medicine, namely.....

....., from which I was graduated in.....
(Insert name of school.)

do hereby make application for a certificate of registration, as pro-
vided by section....., chapter....., of the Acts of.....

I have practiced veterinary medicine in this state.....years
at....., years at.....

My residence is.....street,

My office is.....

I am a member of.....
(Give names of veterinary medical societies)

.....
(Signature)

.....ss.19....

Then personally appeared before me the said.....
and made oath that the above statement, by him subscribed, is true.

.....
Justice of the Peace.

V

FORM B.

A fee of \$.....must accompany application
 Application No.....19....
 Received19....
 Registered19....
 Approved19....
 Rejected19....

APPLICATION FOR REGISTRATION IN VETERINARY
 MEDICINE

Town or City.....State.....19....

To the Board of Registration in Veterinary Medicine:

I, of
 (*Write full name, do not use initials*)
 having been a practitioner of veterinary medicine in this state con-
 tinuously for a period of three years next prior to.....
 do hereby make application for a certificate of registration, as pro-
 vided by section....., of chapter.....of the Acts of.....

On the.....day of....., 19...., I was a resident
 of.....in this state, and practicing veterinary medicine
 at....., my office being situated at.....

Since then I have practiced veterinary medicine at.....

 (*Give places where you have practiced and time spent at each place*)

Have you any other business or occupation?.....
 State its character.....

I am.....years of age, my legal residence is.....
 my office is at.....

STATE OF.....

.....
 (*Signature*)

.....ss.19....

Then personally appeared before me the said.....
 and made oath that the above statement, by him subscribed, is true.

.....
Justice of the Peace,

VI

FORM C.

A fee of \$.....must accompany application
 Application No.....19....
 Received19....
 Registered19....
 Approved19....
 Rejected19....

APPLICATION FOR EXAMINATION FOR REGISTRATION IN VETERINARY MEDICINE

Town or City.....State.....19....

To the Board of Registration in Veterinary Medicine:

I, of
(Write full name, do not use initials)
 hereby make application for examination, that I may be registered
 as a qualified veterinarian, as provided by the laws of.....
 I was born in....., State of.....,day,
month, 18.....

My preliminary education was received in the.....schools
 of.....

I have received academic or collegiate honors, viz.:.....

I have studied veterinary medicine.....years with Dr.....
 of and.....

I have completed annual courses in the.....Veterinary
 School in.....in the years....., also.....courses
 in the.....Veterinary School in.....in the years.....

I received the degree of.....from.....Veterinary
 School in the year.....

I have had hospital experience, viz.:.....

I have practiced veterinary medicine.....years in.....
 and.....

I am a member of medical or veterinary societies, viz.:.....

My post-office address is.....

STATE OF.....

.....
(Signature)

.....ss.19....

Then personally appeared before me the said.....
 and made oath that the above statement, by him subscribed, is true.

.....
Justice of the Peace.

VII

PUBLIC DOCUMENT. No.

.....ANNUAL REPORT
of the
.....BOARD OF REGISTRATION IN
VETERINARY MEDICINE
FOR THE YEAR.....

STATE
SEAL

VIII

MEMBERS
of the
.....BOARD OF REGISTRATION
IN VETERINARY MEDICINE
Year.....

Member	Chairman.	Residence
Member	Secretary.	Residence
Member		“
Member		“
Member		“

IX

The..... of

REPORT

Board of Registration in Veterinary Medicine.
Secretary's Office.....19....

To His Excellency.....Governor.

Sir:—

(Number of pages necessary)

X
TABLE A

	Number Examined	Number Registered	Number Rejected
July examination			
November examination			
Totals			

XI

TABLE B

Schools represented by candidates	Number Examined	Number Registered	Number Rejected
.....			
.....			
.....			
Totals			

XII

TABLE C

Number of Examinations held.	Examined	Candidates registered as result of					Rejected
Schools represented by candidates		First Examination	Second Examination	Third Examination	Fourth Examination	Fifth Examination	
Totals							

XIII

FINANCIAL STATEMENT

.....
.....
.....
.....
.....

Respectfully submitted,

Member.....Chairman

Member.....Secretary

Member.....

Member.....

Member.....

XIV
APPENDIX
LAW RELATING TO THE REGISTRATION OF
VETERINARIANS
Chapter..... Acts of.....
AN ACT TO PROVIDE FOR THE ESTABLISHING OF A
BOARD OF REGISTRATION IN VETERINARY
MEDICINE

XV
RULES AND BY-LAWS OF.....
BOARD OF REGISTRATION IN VETERINARY MEDICINE

1. Applications and fees must be in the hands of the Secretary at least three days prior to an examintaton.
2. Candidates are examined by number only, their names not appearing on examination books, and their numbers being known only to the Secretary.
3. Candidates are not informed of their percentages if they fail to pass an examination.
4. No examination questions are given out by the Board.
5. Information of the illegal practice of veterinary medicine given to the Board is held confidentially.

XVI
SCHEDULE OF VETERINARY EXAMINATIONS

XVII
STATE.....
BOARD OF REGISTRATION IN VETERINARY MEDICINE
Application number.....
Examination in.....

Number of Questions.....	1	2	3	4	5	6	7	8	9	10	Per Cent
Markings.....	11	12	13	14	15	16	17	18	19	20	

Date.....

.....Examiner

STATE
SEAL

XVIII
INSTRUCTIONS TO CANDIDATES FOR EXAMINATION IN
VETERINARY MEDICINE

Dates.....

Examinations will begin each day at 10 a.m. and continue until 5 p.m. with one hour intermission for lunch.

1. Write your application number (given on your admission ticket) on the outside of the cover of each book before opening it.
2. Write legibly with ink, answer the questions in the order given, and number each answer.
3. The question list must not be detached.
4. Write on both sides of the leaf.
5. The exact time allowed for each book is stated on the question slip.
6. You are at liberty to leave the room when you finish your book, not to return until the hour for the next.
7. Be in your seat promptly at the beginning of the examination hour.
8. Each person is expected to attend strictly to his own work. Communications with others, or attempts to obtain information from the books of others, will be noted.
9. The card designating your number should remain in its proper place during the entire examination.
10. The result of your examination, whether satisfactory or unsatisfactory, will be mailed to your address in about three weeks from this date.

XIX

QUESTIONS IN.....

Time allowed, 3 hours.

1?
2?
3?
4?
5?
6?
7?
8?
9?
10?
11?
12?
13?
14?
15?
16?
17?
18?
19?
20?

(Number of pages necessary)

[Criticisms, suggestions and inquiries are invited. Communications may be addressed to Dr. Thomas E. Maloney, Fall River, Mass., or Dr. E. W. Babson, Gloucester, Mass.]

CLINICAL AND CASE REPORTS

PERFORATED BOWEL IN THE HORSE

A. P. DREW, Grand Junction, Colo.

On November 5th, I received a call from Mr. Whittekein, at the Durham stock yards, to come as soon as possible and see a horse that had been gored by a steer. Upon inquiring as to the nature of the injury, Mr. Whittekein informed me that while trying to catch a steer that had escaped from the stock yards, the steer had gored his horse, just in front of the stifle and the bowels were hanging out about six inches. I directed him to get a clean laundered towel, wrap it around the bowel and hold it from coming out any further until I arrived. Also to boil two gallons of water. Upon arrival, I found an aged bay mare, weighing about 1000 pounds, perspiring freely, pulse and respiration accelerated, pawing and wanting to lay down. I administered one-quarter grain each of strychnine and atropine, placed my instruments in a pan to boil, then wrapped a sheet around the animal's abdomen, securely fastening it by sewing with strong twine, leaving the towel wrapped around the protruding bowel. The casting harness was then adjusted, and the animal cast on a canvas blanket. Chloroform was then administered until anesthesia was complete. After thoroughly cleansing my hands I had the sheet and towel removed, the abdominal wound was about 8 inches forward of the stifle joint, and some 8 or 10 inches of the small intestine protruding. The bowel was somewhat congested, completely filling the circular wound in the skin made by the steer's horn. On examining the bowel I found a tear about 2 inches long from which fecal matter was discharging. I then irrigated the bowel and skin in the vicinity of the wound for several minutes with warm, normal salt solution, and placed pads of aseptic gauze, wrung out in salt solution, around the skin wound and bowel. An assistant then held the bowel, grasped firmly between the gauze pads, exposing only the torn surface, while I stitched the wound with an aseptic gut suture, being careful to bring the serous surface in contact, turning the edge of the wound in about one-eighth of an inch. The bowel was again irrigated with warm salt solution, and the skin opening enlarged until the bowel could be returned to the abdominal cavity without using force.

The muscles and peritoneum were found torn for several inches and the skin incision was extended until the peritoneum could be grasped with forceps, and was then stitched with a chromic gut suture. The muscles were also stitched with a chromic gut suture, and the skin closed with braided silk interrupted sutures, placing a piece of iodoform gauze at the lowest point for drainage. The hair was then clipped off around the skin wound, painted with tincture of iodine, and dusted with powdered camphalum. The animal lay quiet for about an hour after the chloroform was discontinued, then was assisted to her feet and placed in a box stall. Her head was hitched short so she could not lay down, and food and water withheld for 24 hours. Water was given in small quantities. Food was withheld for another 24 hours. After this a light diet consisting of bran mash and a small quantity of alfalfa was allowed, and the wound dusted twice daily with camphalum.

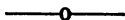
November 6th, pulse and temperature normal.

November 7th, pulse and temperature normal. Animal very hungry, some edema around the wound.

November 9th, pulse and temperature normal, slight discharge of pus from the drain. Administered one ampoule of poly bacterins. Painted wound with tincture of iodine.

November 15th, stitches were removed. Wound healed except small place where drain had been. At this time the animal was turned loose and allowed to lie down for the first time since being injured. Also placed on full ration.

I credit the successful termination of this case, first to the administration of an anesthetic, second, to the free use of normal salt solution, third, not disturbing the hair or skin except to irrigate it with salt solution, until the bowel had been returned and the wound sutured.



THE TREATMENT OF TETANUS WITH TETANUS ANTITOXIN

IR. BERGH, D.V.S., Suisun, California.

On a number of occasions when in attendance on various veterinary meetings as well as in a number of personal conversations with other practitioners it has been my experience to hear reports of little or no results from the use of tetanus antitoxin in the treat-

ment of tetanus in horses. My experience has been so different from the usual reports of such treatment and I have so much faith in proper sized doses of tetanus antitoxin that I want to present this report in defense of tetanus antitoxin in treatment.

The first thing I want to say is that if we expect results from the use of tetanus antitoxin in treatment we must expect to give sufficient dosage. It is not uncommon to hear some practitioner say that he gave the antitoxin in a dose of 500 or 1500 units and got no results, which is exactly what one would expect who understands the necessities in connection with this treatment of tetanus. In some sections of the country where the disease is more prevalent and apparently more virulent it is quite possible that even large doses of the antitoxin will not be of a great deal of service. About this I cannot say because I have had no extended experience in different localities. I do want to make it plain, though, that if you wish to get results you must give a sufficient amount. As a preventive measure I have absolute confidence in the antitoxin and believe that 1500 units should be administered whenever one has cause to suspect infection. If we could always do this the disease could be almost entirely prevented, but unfortunately this cannot be done since very often we do not see the case until the symptoms have developed.

The factor of expense, in the treatment of animals with a sufficient quantity of the antitoxin to be effective, in the majority of cases, is a thing which is of prime importance and this cost should be explained to the owner of the animal, at the start, to see if he is prepared to spend the amount of money, which may be necessary in giving the animal enough antitoxin to cure the disease if a cure is possible. My experience has been that we should not become discouraged if the patient does not show an immediate response. I have found in some of my cases treatment was kept up for as long as six or eight days before good results were apparent.

I naturally do not depend entirely upon the antitoxin, as I believe in doing everything possible to aid the animal in its resistance. When it is possible to find the seat of infection, I use strong disinfectants as well as, in many cases, cauterization and the removal of tissues, if advisable. Idiopathic cases I treat the same as others. Of course, I use drugs when indicated, but these are used either subcutaneously, intravenously, or intratracheally, never orally. I find also that much better results are obtained when animals are

confined in a dark box stall away from noise and excitement. I fill the ears of the animal with cotton and use every other method possible to prevent the spasms. I inject the serum subcutaneously into the neck, first clipping the hair and further disinfecting the skin. I presume intravenous injections will act more rapidly than subcutaneous ones and in some cases injection into the vein should be employed. My usual dosage is 9000 units daily, divided into three doses of 3000 units each. I give this quantity when necessary for four days, then decrease to half this amount, giving 1500 units three times a day.

I have been practicing in this one place for the past six years and have had 17 cases. Of these, 12 have made good recoveries treated with the antitoxin as above described. One case died after giving 15000 units. Another died after giving 24000 units. Three cases received no serum and all three of these died.

I give herewith brief case histories: CASE No. 1. Oct. 9, 1909. Was called to see a horse which was lame, due to a recent nailprick. Upon my arrival I found a case of tetanus, and so informed the superintendent, who told me to do the best I could and not hesitate about the expense.

I began with 3000 units in the morning, gave the same dose at noon and the same in the evening. This I kept up for four days. The nail-hole was curetted thoroughly and the following dressing was applied: carbolic acid, glycerin and distilled water, then iodoform gauze, pack and bandage. This I dressed daily. After using 9000 unit doses of serum 4 days, I cut it down to 4500 unit doses for 4 days, then to 1500 unit doses twice daily for 4 days and last about 500 units for a couple of days, twice daily. This mare, weighing about 1800 lbs. made complete recovery and was ready to work within one month. Gave altogether 70,000 units of tetanus antitoxin.

CASE No. 2. Oct. 10, 1909.—Three year old male colt, weight about 900 lbs. When I arrived I saw the colt in the field and was told he had been down about 30 hours. I tried to help him up, but he was as stiff as a board. The horse died that evening, without having received any antitoxin. This case was idiopathic tetanus.

CASE No. 3. May 7, 1910.—Old driving horse, snagged between the 5th and 6th rib by limb of a fruit tree. This horse had been suffering several days from tetanus, according to the history. I advised the owner that the animal was too far gone for treatment,

and as she was only valued at about \$40.00, none was given. She died that evening at 6 o'clock.

CASE No. 4. July 12, 1910.—Four year old heavy draft horse weighing about 1500 lbs. This horse was in the last stages of tetanus and no antitoxin was used. He died a couple of hours later. Had been down two days. Infection probably occurred through an open collar bruise.

CASE No. 5. Nov. 14, 1910.—A horse was brought to me. The owner said that the horse could not eat. I at once diagnosed the case as tetanus. We brought the horse into a box stall, with plenty of bedding. Arecoline hydrobromide 1 gr.; strychnine sulphate $\frac{1}{2}$ gr.; and atropine $\frac{1}{2}$ gr. was at once administered. Trismus was present so I had not much faith in the case, although the owner wanted me to do all I could for him. I gave the animal the same doses of antitoxin as in case No. 1, with arecoline and strychnine twice daily for 3 days. Trismus gradually disappeared, the horse began to eat and drink and was sent home after making a perfect recovery. This was an idiopathic case. Gave altogether 60,000 units of antitoxin.

CASE No. 6. Jan. 11, 1912.—A two year old colt contracted tetanus from a nail in the foot 10 days previous. 45000 units of antitoxin were used and the colt made a good recovery.

CASE No. 7. May 9, 1912.—Was called to Joyce Island to fix a gray stallion's teeth, (as the Supt. expressed it) and when I got there, told them to back the stallion out from his stall. Noticing his stiff gait as well as the membrana nictitans and other symptoms, I diagnosed tetanus. They told me that the animal had picked up a nail in the foot about 3 weeks previous. We had to cast the horse to curette his foot and dress it. The stallion made a perfect recovery. Gave 60000 units of antitoxin.

CASE No. 8. Aug. 13, 1912.—Called to place where they had lost two horses, one and two months previously. They told me over the phone that they knew they had some infectious disease among their horses, but did not know what it could be. Upon my arrival I found a grey horse 8 years old, weighing about 1200 lbs. suffering from tetanus. I questioned them regarding the other two horses that had died and discovered that the first horse had a collar bruise on its shoulder, but they did not think anything of it. The second horse had later on been using the first horse's harness and contracted a bruise at about the same place. This horse also

died, having shown the same symptoms as the first one. The horse was examined and I found a bruise about the same place on the shoulder, as had the other two horses which died. I asked to see the harness and then found that the collar was slightly torn and a nasty scab surrounded the tear. My diagnosis in all three cases was probable tetanus. These three horses had been using the same harness. Of course, the collar was burned in my presence and the other collars were scraped and washed in disinfectants. I treated the animal and to the owner's surprise, he made a perfect recovery. Will add that sometimes preventive measures against tetanus are of great importance as I found out in this particular case. If I had let the tetanus bacilli remain in the old harness, perhaps he would have lost every horse on the ranch. The wound, of course, was treated and the amount of antitoxin used was 55000 units.

CASE No. 9. Jan. 28, 1913.—Was called to see an 1000 lb. horse on pasture. The owner told me he had lockjaw. After seeing the horse, I advised the owner to get a truck and they brought him to his barn. The third day in the morning they rang me up and told me I had better come out and kill him because he was down. I went to see the animal and found that the floor was very slippery. We put in some gravel and straw, got my slings and raised him up, letting him hang in the slings four days, after which they were removed as the horse was doing nicely. Made perfect recovery. Gave 51000 units of antitoxin.

CASE No. 10. July 29, 1913.—Owner came to my office telling me about a fine mule that was not working the way he ought to the last three days; said he had not worked him the last day. I asked him for the symptoms and history. Diagnosed the case as probable tetanus and told him we had better go out at once, which we did and found what I suspected—a well-developed case of tetanus. I gave 61000 units of antitoxin. Mule made perfect recovery.

CASE No. 11. Aug. 8, 1913.—Was called to see a yearling colt. Found the colt affected with tetanus and his foot in a frightful condition. The foot was attended to and the leg kept in a strong solution of disinfectant for several days. The antitoxin was used, 40000 units in all. The colt made a speedy and perfect recovery.

CASE No. 12. June 22, 1914.—Owner asked me if I could do anything for a horse with lockjaw. I told him I thought so. Said the horse had been affected for 10 days. I found the horse on pasture in rather bad shape, although he could walk fairly well. I

told them that there was a chance of saving him. They did not believe it and decided if I would take the horse away from the ranch I could have him for nothing. I had the animal brought to my hospital and treated him. After giving 55000 units of antitoxin the animal, a five year old horse weighing about 1250 lbs., made perfect recovery.

CASE NO. 13. March 9, 1915.—Found 1500 lb. horse suffering from tetanus. I had him brought to my hospital, examined his feet and found pus in left front foot, caused from a nailprick. I cut out the nail hole, dressed it daily in the same manner as in case No. 1 and gave 60000 units of antitoxin. He made a perfect recovery. The owner of this horse is the same party that owned case No. 5, previously described.

CASE NO. 14. July 26, 1915.—Mule with tetanus. I treated the case, which made a perfect recovery, after 60000 units of antitoxin had been given. This was an idiopathic case.

CASE NO. 15. Oct. 25, 1915 at 1:30 A. M. I was called to see a three year old colt, weighing about 1200 lbs. Owner told me over the phone that the colt was suffering from colic, as it was down. Upon my arrival I found a case of tetanus and, as the owner had been away for a number of days and had not known about the condition of the colt and could not obtain correct history from the attendant, I was undecided what to do. The poor animal had dug himself deeply into the ground in the corral. I told the owner that I was almost sure I had a hopeless case to deal with and I advised him what the cost of the serum would be, but if the animal should die, he would die within a day or two. He was very fond of the colt and wanted to try the antitoxin. I told him about what success I had with tetanus and I would not lose my reputation by treating this case and I did not want the antitoxin to be knocked if the animal died. I gave 15000 units and he died. This colt got infected through a bruise of the heel.

CASE NO. 16. Nov. 25, 1915.—I was called to see a large, three year old colt, weighing about 1400 lbs. suffering from tetanus. I treated the case with success. He made a perfect recovery after 70000 units of antitoxin had been given. The peculiarity about this case was that on the 5th day the owner rang me up and told me the animal was breathing very heavily and rapidly, was practically unable to stand on his feet. I went out and found the animal was foundered. I told the owner not to worry. Here is a

case where leukocytic extract (Archibald) was used and six c.c. of the same was given intratracheally once daily, until 42 c.c. had been given. This is the first of my cases of tetanus where laminitis was also present.

CASE No. 17. Jan. 17, 1916.—A case of tetanus was brought to me. I advised them the same as everybody else about the price, and my success, in those cases, etc. The case was brought to my hospital. A deep wound was found, caused from collar gall. I burned same out thoroughly with a red hot iron, then injected a strong solution of disinfectant. The third evening the animal did not look quite as well as she should. The next morning I saw her early. She was the same as the night before. I watched her, off and on, the whole forenoon. She grew worse and I brought her out to the corral where she fell and I then had her shot. I gave her 24000 units of antitoxin.



DOG CASE. Jan. 12, 1916 a dog was brought to me with tetanus caused from a foxtail which had entered between the toes. The only thing I did to him was to operate on the foot, disinfected and dressed it twice. Stimulants were given hypodermically but with no results. The third day I destroyed the dog and just prior to the injection of hydrocyanic acid into the heart, I took a picture of him, which accompanies the story. Notice the tail, the gluteal muscles and the legs. The eyes were almost covered by the membrana nictitans.

In conclusion I would say that in spite of all of the reports of unsatisfactory results from the use of this serum, I have the greatest

of confidence in it and with very good reason I believe, when the results I have obtained are considered. All of the antitoxin used was made by The Cutter Laboratory at Berkeley, Cal., and upon inquiry I find that it is the usual practice to place a liberal excess of units in each package at the time it is put up to take care of any loss of potency during its market life and, as I obtain the serum in small lots so that it may be as fresh as possible, the actual number of units given in each case is well in excess of the units indicated upon the label on the package. The units I have given in this report. I always keep 9000 units on hand in my office.

I believe a great many that have reported very poor results will save a good many of their cases if they will use as much of the antitoxin, or even more of it than I have here suggested.



HOW MANY LIVES HAS A CAT?

JAMES H. HESTER, V.S., Santa Barbara, Calif.

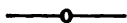
A few months ago a lady brought her pet cat to me for examination, claiming that he was suffering from either a dislocated shoulder or a fracture. A careful examination failed to reveal anything abnormal either with the limb or the cat. As we were discussing the case, the cat which the owner was holding in her arms, made an effort to escape, winced and cried out with pain. Resuming my examination I discovered something about one-half inch long between the lower end of the scapula and the thorax which felt as if it might be the first rib broken with end of lower part turned forward. I was told to take the cat, cut down and find out what the trouble was. The cat's struggles, while the anesthetic was being given, forced the object through to the skin, where a small incision revealed the point of what appeared to be a needle or a pin. Taking hold of this with a pair of forceps I drew out about four inches of a pin which then came to a stop, and although I gave quite a firm pull it would come no farther. Taking up a bistoury I passed it down along the pin, enlarging the passageway, until I drew forth a six-inch hat pin with a glass head about the size of the end of an ordinary lead pencil. I supposed, of course, that it was all off with the cat, but to my surprise he was all right in a few days and has shown no ill effects since. There was no scratch

or wound anywhere on the body where the pin might have entered.

Now the questions before the class are: Where and how did the cat get this pin and where was he keeping it until I found it?

The history of the case: Three nights before, the owner went to the show and left the cat alone in the house. Her hat with two pins in it was on the shelf about six feet from the floor. While the owner was away the folks in the adjoining part of the house heard a noise as if the cat had fallen or jumped from the shelf to the floor. When the owner returned, she noticed the cat retching as if trying to vomit, and put him out of the house for the night, thinking no more about it until I found the pin.

After summing it all up, my guess is that the cat, for some unexplainable reason must have swallowed the pin head first, probably fell upon it, which when it passed down as far as it could was forced back by the movements of the body. But how can you explain such a migratory trip of the pin without more damage being done to the cat, and why did not the contents of the digestive tract escape through the wound where the head of the pin passed and cause trouble?



ABORTIVE TREATMENT OF WOUND INFECTIONS

CARREL, DAKIN, DAUFRESNE, DEHELLY AND DUMAS

The confidence inspired by the use of tincture of iodine and the packing of wounds has disappeared long ago. Experience has shown that the various kinds of military wounds are all infected, and that the application of iodine does not prevent gaseous gangrene, septicemia, or chronic suppurations. It is also known that such complications cause irreparable lesions and even death in a very large number of cases. In 1000 amputations observed by Tuffier at the "Maison-Blanche" the operation was necessitated in about 800 cases, not by the gravity of the trauma, but by infectious complications. In spite of the utter failure of the principles used in the beginning of the war in the treatment of wounds, no new methods were developed. Confusion reigned in the theory and practice of the surgeon. It became therefore, a matter of great importance that the treatment given to the wounded should yield better returns. This result could only be obtained by establishing a single method which would be uniformly used by all, in spite of its tem-

porary and approximate value. In this way the wounded were protected from the therapeutic fantasies due to lack of central direction.

In order to obtain the maximum results with a minimum of suffering, effort and money, it was necessary to prevent wound complications rather than to combat them. It is infinitely more simple to abort an infection in the beginning than to discover efficacious methods for the treatment of gaseous gangrene, septicemia, suppurations and their sequelae.

The principles upon which the abortive treatment of infection should be founded have long been known. But they had not been elaborated into a simple doctrine capable of practical application. The chemical, bacteriological and clinical researches made at the Temporary Hospital 21 of the Rockefeller Foundation at Compiègne, have shown the conditions under which the chemical sterilization of a wound can be realized.

It is known that all wounds made by fragments of shells, grenades, etc., are infected. Bacteriological examination made about 6 hours after injury, shows that in all wounds there is a varied microbial flora, aerobic and anaerobic. Two important facts have been ascertained. The first is that the microbes are generally few in number. Sometimes the smear must be moved and several fields examined under the microscope before a micro-organism is found. The second is that the microbes are localized around the projectile and débris. They have not yet had time enough to spread over the entire surface of the wound. If the examination is made after 24 hours or later, the appearance of the smear is altogether different. A very large number of microorganisms are found. They are often so numerous that they cannot be counted. Besides, they are to be found throughout the entire extent of the wound.

These observations confirm those made clinically. They show that during the first few hours following trauma it is easy to remove infectious organisms, while this operation becomes more and more difficult as the organisms are allowed to multiply, diffuse over the surface of the wound and infiltrate its walls. The abortive treatment of infection must therefore be given as soon as possible after the injury.

In what manner shall this be accomplished? It is known that the microorganisms are localized about the infectious foreign bodies

and in the abrasions in the walls of the wound. While it is easy to remove fragments of shells and débris, it is impossible to mechanically remove small particles of débris and microorganisms lodged in the abraded surfaces. It is therefore necessary to kill the microorganisms attached to the small foreign bodies and to the wound surfaces by means of a liquid which penetrates and will still be in contact with the tissues for a considerable time.

The antiseptic method has already rendered immense service. It were folly to question this because of certain laboratory experiments made with a technic of doubtful value. In surgery the clinical results are paramount.

Dakin has found a solution of sodium hypochlorite which has a very energetic antiseptic action, is not irritant and costs little. The solution, prepared by the method of Dakin, may be used of such concentration that it will sterilize every part of the wound with which it comes in contact. Since this solution will penetrate every diverticulum of the wound, a complete sterilization will be obtained, provided the solution be constantly renewed.

1. *Precocity of the treatment*—At the "first aid" stations, disinfect the skin with tincture of iodine. If the wound be narrow, inject the hypochlorite solution into the crevices. If the wound be large, dress it with gauze soaked in hypochlorite. Do not use water tight material over the dressing. This hasty disinfection is by no means dispensable. It greatly ameliorates the condition of the wound.

The wounded must be transported as rapidly as possible, to the ambulance or to the hospital where they are to receive complete surgical treatment. Only those suffering from severe hemorrhage or shock are to be treated on the spot. Every possible effort must be made to have the wounded arrive at the hospital not later than six hours after the injury. The future of the wounded depends upon the speed of transportation and treatment of the wound as soon as possible. There are no small wounds; some that are insignificant in appearance may be followed by grave complications. All must be completely treated.

2. *Mechanical cleaning of the wound*.—The foreign bodies, projectiles, débris, etc., are immediately removed. The finger, gloved in rubber, is gently introduced into the wound; often the foreign bodies are extracted in this way. Sometimes the radiograph, etc. are necessary. The wound should be opened sufficiently

to permit its cleaning and exploration. But it is important to cause no injury, and to renounce such brutal manoeuvres known as curetting, etc. of wounds. The débris, projectiles, and splinters of bone are delicately removed with the fingers or with dissecting forceps. Hemostasis must be accomplished as neatly as possible. In jagged wounds and especially in fractures, consideration must be given to the extent of the shattering and the location of the diverticula of the wound.

3. *Chemical sterilization of the wound*—An antiseptic acts only at the place where it is applied and then only when applied long enough. The antiseptics used up to the present were very feebly germicidal or too irritant to the tissues. The sodium hypochlorite solution prepared by Dakin is not irritant and its germicidal power is very great. Javel water must not be used. Its content of hypochlorite is not constant, it may contain free chlorine or free alkali, especially when it undergoes decomposition. Every pharmacist can prepare Dakin's hypochlorite solution. (*Presse Médicale*, Sept. 30, 1915). A one-half percent solution is used. This solution is strongly antiseptic and still it may be applied to the skin or to the tissues for several days or even weeks without causing irritation. It must not be used at the same time with alcohol nor must it ever be heated. The solution is injected with an ordinary syringe or with one made of rubber.

The hypochlorite should penetrate all the crevices of the wound. It should be continually renewed because it is decomposed by contact with protein material. To instill it into the tissues, rubber tubes are used, having a diameter of about 6 millimeters ($\frac{1}{4}$ inch) pierced by a single hole about $\frac{1}{2}$ centimeter (1.5 inch) from the end. Tubes of different lengths are used, pierced by a hole and provided with attached sponges. When the wound is narrow or a large wound has narrow diverticula, the sponge tubes are introduced into the narrow spaces. In case of fracture the end of the tube should be placed among the fragments. When liquid is passed down the tube, it is imbibed by the sponge and held in contact with the wound surfaces instead of running out immediately. In superficial wounds and in wounds that are large and jagged, naked tubes are applied to the bottom of the wound or introduced into its diverticula. The wound is then filled with gauze. Before finishing the dressing, the liquid is passed into the tubes and the operator assures himself that it reaches all parts of the wound. The dressing is finished with a

layer of non-absorbent cotton, through which the rubber tubes pass. The liquid is to be instilled through these tubes.

The antiseptic must be continually renewed. Every hour or every two hours a sufficient quantity of the liquid is to be injected into the tubes with the aid of a syringe (*seringe de Gentile*). It is still better to use continuous instillation. The quantity to be injected depends upon the size of the wound; it is necessary that the surfaces of the wound be well moistened.

4. *Limbs must be carefully immobilized* in cases of fracture or wounds of the joints. As soon as possible, plaster dressings enforced by metal bands must be used.

The dressing should be examined every day and changed as often as necessary.

5. *Reunion of the wound.*—The lips of the wound must not be reunited until a bacteriological examination has shown that the wound has become aseptic. The time will vary according to the nature of the wound, the nature of the infection, and especially with the length of time elapsed between injury and treatment. Many wounds never become sterile completely, and consequently, must not be reunited. The reunion of tissues must not be made by sutures. It is sufficient to bring the lips of the wound together with adhesive bands, and to bring the deeper parts of the wound together with an appropriate compressive dressing.

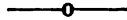
The efficacy of the method has been demonstrated by a variety of methods, bacteriological, clinical, etc. The action of the Dakin hypochlorite solution was first studied on suppurating wounds. Comparative tests made on different parts of the same wound or on two similar wounds on one person, showed that in the wound or part of the wound treated by the Dakin solution, the number of organisms diminished, the secretions dried up, while the condition of the control wound or control part of the wound did not change. In these tests it was found that phagocytosis continued and cicatrization took place in spite of the use of the antiseptic solution.

Only one rigorously comparative test was made, because it is rare that one finds a case with two wounds that are identical. Such a case was found, in which two shell wounds were only a short distance apart, (several centimeters). The wound treated with hypochlorite solution through a sponge tube, remained odorless, and without purulent secretions. The other wound suppurated. The observation was confirmed by many other similar ones, but not so rigorously controlled, because wounds are not easily comparable.

Generally, reunion takes place 8 to 14 days after the injury in such fashion that the wounds are completely cicatrized. Wounds will not become sterile unless the hypochlorite solution penetrates all the recesses; however, the infection is considerably diminished when this does not take place.

Revue D'Hygiene et de Police Sanitaire, Vol. 37, pp. 1016-1024, 1915. (Work done at the Rockefeller Foundation and Hospital at Compiègne, France).

Note by abstractor:—To those not familiar with the metric system of weights and measures, Bureau of Standards Circular No. 47 on Units and Weights and Measures will be useful. A copy can be obtained gratis by addressing a brief note to "The Director of the Bureau of Standards, Washington, D. C." BERG.



REMOVAL OF A SHELL SPLINTER WITH THE AID OF AN ELECTROMAGNET

VETERINARIAN RUDERT

An officer's charger had been wounded in the gluteal region, by a shell splinter.

When the horse came under observation there was a wound with a purulent opening 12-15 cm. long.

The gluteal region was shaved, disinfected and a local anesthetic injected. An electromagnet, obtained from one of the war hospitals, was passed over this region. A distinct swelling was produced over the splinter. The magnet was removed and an incision 3 cm. long was made over the site of the splinter. On applying the magnet a second time, the splinter was drawn through the uninjured muscles and completely removed. A vertical opening into the old fistulous tract resulted, and with ordinary treatment the wound healed readily in 14 days.

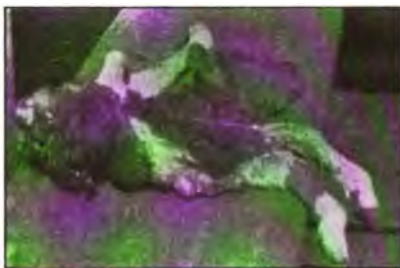
The splinter removed was 5 cm. long, 1 cm. wide and $\frac{1}{2}$ cm. thick.

The conclusion arrived at in this case is that the safest and easiest way of removing shell splinters is by means of an electromagnet. The advisability of constructing a light electromagnet of sufficient strength to extract a splinter through the unbroken skin, is recommended. If it is impossible to make one portable of sufficient strength the hospitals should be supplied with one of sufficient strength and the field hospitals with one strong enough to locate the splinter.

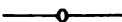
Zeitschrift f. Veterinärkunde, September 11, 1915.

AN ABNORMAL CALF

R. G. FLOWERS, V.S., Fort Worth, Texas.



The above figure is of an abnormal calf delivered from a small Jersey cow belonging to A. M. Moates, Fort Worth, Texas. The calf's head and fore legs were normal. The hind legs were attached to the shoulders and pointed upwards. The internal organs had developed posterior to the legs. The mother is a very heavy milker, has six fully developed teats and gives milk from each of them.



TWO CASES OF PROLAPSUS OF THE RECTUM IN PIGS

STEIGET LAUTERECKEN

The first case was in a sow which had farrowed 8 days before coming under observation.

On examination the prolapsus was found to be of the size of a child's head, the surface was gangrenous. Operation was decided upon for the sake of the young which could not be raised by hand.

The sow was secured on her side, with the hind quarters somewhat raised. The prolapsus was thoroughly washed, first in warm water then with camomile tea. The loose gangrenous tissues were carefully removed with the scissors, and the wound washed again with warm water and camomile tea, the prolapsus was returned to its normal position by pressing gently with the fist, this proved a troublesome process on account of the struggles and cries of the patient.

Dr. Lauterecken then allowed an assistant to hold the rectum in place, and applied a slip-knot (tobacco pouch knot) over the

tissues; this knot was drawn tightly, so that the index finger could just be inserted into the rectum.

The sow was now given a purge of oil, and exercised by driving her for a short distance up-hill.

The owner was advised to feed the animal sparingly on milk for a few days, and to give the patient constant exercise by driving her about the place.

In spite of the marked degeneration of the tissues the wound healed readily, and this sow has had another litter of pigs without any recurrence of the prolapsus.

The second case was also in a sow, which had a prolapsus of the size of an apple. The owner said this had been caused by the boar introducing the penis into the rectum.

This case had the same surgical treatment as the first one and recovery was complete. The interesting point about this case is its cause.

Münchener Tierärztliche Wochenschrift, January 1, 1916.

RACHITIS IN CALVES

J. V. HILLS, Gowanda, N. Y.

In late December I was called to examine a three months old Jersey calf, one of a pair of twins I had helped the mother deliver about three months before. The attendant said it had been rather weak for a day or two, and now could not get on its feet, but when helped up would stand for a short time, and was now nearly prostrate.

I inquired as to the feeding, as the calves did not seem much larger than when they were born and suspected faulty nutrition, the calf being apparently in very little pain.

I was informed that they were fed on new milk and a prepared calf meal. The mother was a thrifty cow of about six years, rather larger than the average Jersey.

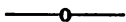
The attendant had been rubbing liniment on the calf's back and limbs. I told him to continue to do so and left a stimulant telling him the calf would probably die but to let me know the next day, when I was informed by telephone that the calf was somewhat brighter, and they would let me know if it died as I wanted to post the animal.

It was more than two weeks before the owner called me up and said the calf had died the day before, and the other twin which, until now, had appeared well and hearty although not gaining much, acted the same as the first. As treatment was useless we waited until this one died, two days later, and found a typical case of rachitis. The pelvic bones and femurs were hyperemic and so soft that they could be easily crushed with the hands. All of the organs were apparently normal. The other calf which was affected much longer would probably have shown more lesions.

The attendant then told me of a five weeks old bull calf that died before either of the twins was taken sick, and which acted much the same. He told me that both cows were bred to a rather unthrifty young bull that was closely related to them, so this might have been hereditary or more likely due to inbreeding.

There is one more cow to calve and I am awaiting the outcome, as the conditions are similar. Have advised the owner against inbreeding, and will start treating this calf for rachitis when it is a few days old.

The cows are kept in better than average sanitary conditions.



CONTRIBUTION TO THE STUDY OF PARASITIC AFFECTIONS OF THE HORSE. A CLINICAL STUDY OF EQUINE STRONGYLIDOSIS.

This is a very valuable and comprehensive study, in which Leneveu has gathered together the scattered data relative to the life histories of the nematodes of the genera *Strongylus* and *Cylicostomum* parasitic in the horse, and the lesions, symptoms, etc., due to them, and grouped these data together to form a clinical entity which he calls strongylidosis. This condition he defines as an afebrile, enzootic disease, beginning usually with symptoms of enteritis and determining a progressive anemia.

Symptomatology, course and termination of the disease. The worm infestation begins while the animals are on the pasture in the spring, and during the succeeding summer and fall there is a latent stage, during which the parasites are undergoing development. The

symptoms, which develop slowly, begin to be evident in November and December, and with the appearance of clinical symptoms the progress of the disease accelerates, the active stage lasting from two weeks to two months. The primary symptoms are diarrhea, anorexia and emaciation. The diarrhea is at first slight, the feces becoming increasingly soft and malodorous. The appetite is at first irregular, then diminishes and finally disappears. The emaciation may at first be concealed by an edematous infiltration filling the lacunae formed by the absorption of fatty tissue; the ultimate emaciation is very marked, the bones prominent, the coat rough, the eyes sunken and the animal very weak. Accompanying the primary symptoms are a small, thready, irregular and at times intermittent pulse, and a pale, anemic, often more or less edematous conjunctiva and buccal and vulvar mucosa.

Secondary symptoms are edema and those due to accidental complications, such as toxi-infection, thrombo-embolism and trauma. Edema may be general (resembling anasarca) or localized; it may appear slowly or abruptly, according to the mechanism producing it. When the heart weakens, there is a slowing of the circulation with a resultant stasis, extravasation and edematous infiltration, giving rise to a progressive, generalized edema; in patients with aneurisms, emboli may not only give rise to colic by their occurrence in the mesenteric vessels, but in the peripheral circulation they may cause slowing or arrest of the circulation with extravasations and edema, the edema being relatively localized, voluminous and rapidly developing.

Of the complications, toxi-infection is indicated by a febrile condition, the infection causing internal or external metastatic abscesses or infectious anthritis or synovitis. Thrombo-embolic complications may occasion the death of the animal or give rise to intermittent colic. Traumatic accidents consist in decubitus from weakness, internal hemorrhage from rupture of aneurisms, or peritonitis from intestinal perforation at the site of a verminous cyst or abscess in the intestinal wall.

The disease terminates in recovery or death, occasionally passing into a chronic condition. Recovery follows elimination of the parasites and healing of the lesions caused by them. Death may be due to one of the accidental complications mentioned or may follow a prolonged anemic, toxic condition with general infection. In chronic cases the lesions are irremediable, the intestinal mucosa

and muscular coat remain thickened and sclerotic, nutrition is impaired, aneurisms impede the circulation, edema, emaciation and diarrhea persist, and the appetite remains capricious.

Etiology and pathology. The foregoing conditions are due to adult and immature worms of the genus *Strongylus* and *Cylicostomum* (the reviewer has taken the liberty of correcting what he regards as errors in the scientific names). The adults of these worms live in the cecum and large intestines. The immature forms have life histories varying with different species. The adult female worms develop eggs which pass out in the manure and give rise to embryos, and these young worms develop in the manure to the infective stage, when they are ingested with food or water and pass to the intestine. From this point development varies, with different species.

Strongylus vulgaris. The embryos burrow through the wall of the small intestine till they reach a blood vessel and are swept around in the blood; they finally attach, as a rule, in the anterior or great mesenteric artery and its branches, and develop to a form resembling the adult but without sexual organs, forming in the meantime aneurisms; the agamic form detaches and passes to the walls of the cecum, forming small abscesses or cysts which may be as large as a nut; finally these cysts open to the lumen of the cecum, setting at liberty the worms, which now copulate and repeat the cycle.

Strongylus equinus. The larvae are found principally in the parenchymatous organs, such as the liver, lungs and pancreas.

Strongylus edentatus. The larvae may be met with almost anywhere, especially under the serous membranes, the pleura and peritoneum.

Cylicostomum spp. The larvae are found in cysts, a half millimeter to 2 millimeters in diameter, in the mucosa of the large intestine, or at times free in the lumen. There are 3 types, the oesophagostomiform, the metastrongyliiform, and the embryonic.

The larvae of *S. vulgaris* determine aneurisms, as noted. If the worms leave and there is no reinfection, the aneurism organizes, but continues to present the constant menace of embolism and rupture. As an embarrassment to the circulation it may occasion intermittent lameness. It is a source of thrombo-embolic colic, which frequently terminates fatally. In the lungs these larvae occur as sharply circumscribed tubercles.

The larvae of species of *Cylicostomum* form cysts in the wall of the large intestine and in opening these form small sores. When numerous they cause thickening and induration, with impairment of function.

The adult worms have a toxic action due to a hemolytic which occasions a progressive anemia; the agamic *S. vulgaris* causes a mechanical thickening of the cecum walls by forming cysts or abscesses. Perforations, sometimes of considerable extent, may take place at the site of an abscess. Species of *Cylicostomum* attach to the intestinal mucosa, causing innumerable small sores which serve as portals of entry for pathogenic bacteria, a serious matter when coupled with the enfeebled, anemic condition and low resistance of the host animal. These bacteria enter the lymphatics and may be found in the mesenteric glands. From this bacterial invasion arises the febrile condition.

The lesions are congestive, inflammatory and verminous. There are simple ecchymoses on the mucosa, the serosa and in the muscular layer, and variable areas of congestion or capillary hemorrhage in the small intestine. In the large intestine and cecum there is a thickening due to connective tissue proliferation following the cysts and abscesses; these may become organized, cicatricial and sclerotic. Beside the verminous cysts or abscesses there are pimple swellings due to the puncture of the mucosa by the worm and the swelling due to inflammatory reaction. Aneurisms may occur in the anterior mesenteric and also in the occipital, pulmonary and uterine arteries. Glandular lesions seem to be almost constantly present, taking the form of infiltration of lymph glands, especially the mesenteric, the glands containing the micrococci habitually present as saprophytes in the intestines; at times abscesses form in these glands and rupture to the abdominal cavity. Miscellaneous lesions are anemia, emaciation, bacterial metastases, and intestinal or aneurismic rupture.

Diagnosis is based on the period of onset of the disease, its enzootic character, and the symptoms. The general symptoms are as already given; especial symptoms are the finding of the worms or their eggs and embryos in the feces and the determination of aneurism by rectal exploration. Prognosis is favorable under careful treatment, except for the accidents already noted.

Treatment is along the line of building up the resistance to repair the organic damage, the expulsion of the parasites, and the

combatting of complications. To build up resistance, Leneveu recommends the subcutaneous injection of a liter of artificial serum containing one-half to one gram of caffeine, once or twice a day; iron in the form of the arsenate; tonics, such as strychnine arsenate or sodium cacodylate; and digataline to replace caffeine when subcutaneous injections cease. To expel the worms, Leneveu recommends carbon bisulphide, in gelatine capsules, giving 2 to 5 grams, according to the size of the animal, every day for 5 days and following this on the sixth day with a purgative, preferably magnesium sulphate. This treatment may be repeated after 12 days. Secondary bacterial complications are combatted by the serum and caffeine and by tonics. If the heart shows signs of weakening, subcutaneous injections of camphorated oil are useful. For the colic he suggests tincture of opium with ether as a drench or morphine intravenously. For decubitus put the animal in slings. Abscesses may be treated with mild antiseptics when accessible. For severe diarrhea use powdered charcoal, bismuth, salol or benzo-naphthol. Milk, beginning with small amounts and increasing the amount to 8 to 10 liters a day, is the best adjuvant treatment.

Prophylaxis. Reinfection may be controlled by careful selection of pasture to avoid infection from food, and by using only pure potable water.

M. C. HALL.

G. LENEVEU

Rev. gen. d. med. vet., Toulouse, Dec. 15, 1915, v. 24 (288), pp. 593-612.

FRANCO-BELGIAN VETERINARY RELIEF FUND. It is reported that the Belgian and many of the French veterinarians are in a deplorable condition as a result of the war. A relief fund of 20,000 francs (about \$4,000) has already been raised among the over-taxed French veterinarians. Are American veterinarians interested?

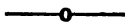
The anti-tuberculosis bill of Dr. J. F. Winchester, of Lawrence, Mass. is arousing considerable public interest in that locality. At the first hearing of the bill, it is reported scant courtesy was allowed to its advocates. A second hearing has been granted at which it is expected a more favorable sentiment will develop.

ABSTRACTS FROM RECENT LITERATURE

ROCKY MOUNTAIN SPOTTED FEVER. A REPORT OF ITS INVESTIGATION AND OF MEASURES UNDERTAKEN FOR ITS ERADICATION DURING 1914. Fricks, L. D. *U. S. Public Health Rep.* 1915, Jan. 15, Vol. 30, No. 3, pp. 148-165.—This report is mainly concerned with the measures for the control and eradication of the disease in the Bitter Root Valley, Montana. A few of the tick eradicating measures are of general interest.

The destruction of small wild animals had a marked effect. At the beginning of the season three dipping vats were in operation. Horses, cattle and sheep were dipped in arsenical solution every ten to fourteen days, a total of 2,615 animals between April and June. Observations show that dipping is insufficient to eradicate the wood tick. Sheep-grazing is discussed at some length. Its advantage is no great labor or expense. Flocks of a thousand and five hundred sheep were used. They were searched for ticks and it was estimated that 25,000 were destroyed during the season, more than fifty times the number destroyed by the dip-pings. It is questionable if the same results can be obtained in other parts with different topographical features.

K. F. MEYER.



THE POISONOUS EFFECTS OF THE ROSE CHAFER UPON CHICKENS. George H. Lamson, Jr. *Conn. Agricultural College, Storrs, Conn. Abstracted from "Science", Vol. XLIII, No. 1100, Jan. 28, 1916, p. 138.*—"Serious losses have occurred each year during June and early July, from chickens having eaten the rose chafers (*Macrodactylus subspinosus*). These losses have often been ascribed to various causes, but close observations have shown that the chickens are very fond of eating these insects in large numbers, and post-mortem examinations have revealed the presence of many undigested insects in their crops. The crops are usually so full as to give the impression that death had been due to a "crop bound" condition of the chickens. Some have also supposed that these deaths were due to a mechanical injury of the crop by the spines on the legs of the insects having punctured the lining of this part of the digestive system, while others have accounted for the death of these chickens by the rose chafers having bitten the crops.

"A number of cases, some of which resulted in the loss of several hundred chickens, were reported to the writer and experiments in feeding rose chafers to chickens were taken up at the Storrs Agricultural Experiment Station in 1909.

"The deaths from this diet usually occurred in from nine to twenty-four hours after feeding. This led the writer to believe that undoubtedly death resulted from a cause other than a mechanical injury to the crop or "crop bound" condition. An extract was made from crushed rose chafers and distilled water, filtered, and fed to chickens in varying doses with a medicine dropper and this resulted in a great many deaths. Small chickens died in a few hours after feeding, older chickens of heavier weight when fed a small quantity of the extract lived but showed signs of poisoning; large doses resulted in their deaths. Mature hens did not die from the extract.

"From 150 to 200 chickens have been fed either with the rose chafers or with varying strengths of the extract to determine the weight of the chicken killed by a certain amount of poison, also to determine the age limit of the chickens killed."

"As nearly as the writer can determine, the rose chafers contain a neuro-toxin that has an effect upon the heart action of both chickens and rabbits and is excessively dangerous as a food for chickens.

"Owing to the fact that the insect feeds upon such a large number of plants, particularly on daisies, it seems essential that chickens be kept in mowed fields and away from yards having grape vines and any flowering shrubs during the month when the rose chafers are about, especially during the years when rose chafers are particularly abundant."

REICHEL.

ENTAMEBIC DYSENTERY IN THE DOG. Darling, S. T. *Proceedings of the Medical Association of the Isthmian Canal Zone, 1915, Vol. VI, part 1, pp. 60-62.*—The first case of a naturally acquired case of amebic dysentery in the dog is described.

The hound was used for hunting deer and had been brought from Mississippi to the Canal Zone. Inasmuch as he was badly infected with hookworm, he was kept under observation. Frequent, bloody, mucous stools accompanied by tenesmus and great pain and progressive emaciation, were noted. During life the trophozoites of entameba could be demonstrated periodically. At autopsy

the entire colon was found to be the seat of minute, red, punctate erosions of the mucosa; only these focal necroses—no ulcers—were found. The intervening mucosa was pale yellow and edematous. Smears contained entamebas, some of which contained erythrocytes.

Microscopically, the lesions are unlike those caused by experimental infection with human pathogenic entamebas, and there are also morphological differences in the trophozoites of the entamebas. In case it is proven by further observations that the entameba found in the dog is a new species, the name *Entameba venaticum* is proposed.

One should bear in mind, however, the possibility of dogs acting as carriers of entamebic dysentery, and be on guard against them.

K. F. MEYER.

ON THE USE OF CERTAIN ANTISEPTIC SUBSTANCES IN THE TREATMENT OF INFECTED WOUNDS. H. D. Dakin. *British Medical Jour.*, pp. 318-320, August 28, 1915. Also in *La Presse Médicale*, pp. 377-9, September 30, 1915.—In order to make a judicious choice of the antiseptic most likely to give useful results in the treatment of infected wounds many different factors have to be considered in addition to germicidal activity, including the irritating properties of the substances, their toxicity, solubility, ability to penetrate tissues and be absorbed, and their chemical reactions with proteins and other tissue constituents.

In judging of the antiseptic action of a substance suitable for the treatment of wounds, it is essential that its germicidal action be tested against microorganisms mixed with blood serum or similar substances, and not simply tested against bacteria suspended in water. The germicidal activity of all known antiseptics is greatly reduced by the presence of blood serum or similar substances, and in some cases this reduction is so great that the compound loses all practical antiseptic value.

Mercuric chloride is probably the least useful and most objectionable as an antiseptic for the treatment of infected wounds. Phenol (carbolic acid) is characterized by a very low germicidal power especially when acting in the presence of serum. When used in sufficiently high concentration for germicidal efficiency, it is decidedly destructive of healthy tissue. Hydrogen peroxide must be regarded as of slight value.

SODIUM HYPOCHLORITE has high germicidal action, and has many other desirable properties. It has been possible to prepare a simple hypochlorite mixture which maintains approximate neutrality under all conditions, is practically non-irritating, and which, when properly applied, has given most encouraging results in the antiseptic treatment of wounds.

Preparation of solutions.—The preparation of a solution of suitable concentration for direct application, containing 0.5 to 0.6 per cent of sodium hypochlorite, may be carried out very simply as follows: One hundred and forty grams of *dry* sodium carbonate (Na_2CO_3), or 400 grams of the crystallized salt (washing soda), is dissolved in 10 liters of tap water, and 200 grams of chloride of lime (chlorinated lime, bleaching powder) of good quality is added. (Do not use calcium chloride). The mixture is well shaken, and after half an hour, the clear liquid is siphoned off and filtered through a plug of cotton. Forty grams of boric acid (sometimes called boracic acid) are added to the clear filtrate, and the resulting solution is ready for use. A slight precipitate of calcium salts may slowly occur, but it is of no significance. The solution should not be kept longer than one week. *The boric acid must not be added to the mixture before filtering, but afterwards.*

A stronger solution may be prepared by decomposing 150 grams of chloride of lime, with 105 grams of sodium carbonate, dissolved in a liter of water. The mixture is filtered and a measured portion (20 c.c.) is rapidly titrated with a boric acid solution (31 grams per liter) until the mixture is acid to an aqueous (not alcoholic) suspension of phenolphthalein. From this titration, calculate the amount of solid boric acid to be added to the rest of the filtrate. An excess of boric acid should be avoided; it is best to add slightly less than the calculated amount.

The concentrated solution thus prepared contains about 4 per cent of sodium hypochlorite, and should be mixed with 6 parts of water before use. It can be kept for a month without serious decomposition.

Application and Results.—To obtain the best results it is essential to commence the antiseptic treatment of the wound at the earliest moment possible, and to bring fresh quantities of the antiseptic solution in contact with all parts of the wound as frequently as possible for a considerable period of time. To give some idea of the quantities of solution employed (for man); 5 to 10 c.c. may be

introduced every two hours by means of rubber tubes into small wounds, using a pipette or syringe, while for the irrigation of such wounds as fractured femurs, accompanied by much destruction of tissue, as much as 1 or even 2 liters a day may be employed. The dilute solution, prepared as described may be used in large quantities for the continued irrigation or instillation of wounds for more than a week without producing visible irritation. As a wet dressing the solution may be used almost indefinitely. The solution is actively hemolytic and must not be injected intravenously.

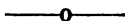
Hypochlorites are extremely active substances chemically, and they should not be used in conjunction with other antiseptics, nor with alcohol or ether.

It is believed that the solution previously described, when properly applied to all parts of the wound, gives better results than can possibly be obtained from powdered preparations of partially soluble materials. Generally speaking, the experiments with powdered substances have given much poorer clinical results than have aqueous solutions.

For the clinical side of the above work, carried out in the laboratories at Compiègne (France) under the auspices of the Rockefeller Institute for Medical Research, see paper by Carrel.

The great success attending the use of this old antiseptic recently brought into prominence would justify its extended use in veterinary surgery in order that its merits may be determined for the veterinarian.

BERG.



POLYPUS OF THE LARYNX. Doct. Luigi Menicagli. *Il Nuovo Ercolani*.—In a calf, there was a polypus, situated on the left side of the epiglottic cartilage at the mucous fold of the base. It had, for ten months, caused frequent spells of coughing, accompanied with phenomena of suffocation. The cough taking place principally during the deglutition of either solid or liquids was followed with rejection of the food. With great difficulty the author succeeded in his exploration of the larynx per mouth and found the growth as big as a bean with a long peduncle, which allowed it to be displaced by the movements of deglutition and its dropping in front of the larynx, producing a temporary occlusion of the parts. The removal of the growth was comparatively easy. The mouth was kept widely open with a speculum, the tongue depressed on one side, the polypus taken hold of with a pair of forceps with long

branches and torsion separated it from its epiglottic attachments. The hemorrhage that followed was of no importance.

A. LIAUTARD.

A FURTHER CONTRIBUTION TO THE KNOWLEDGE OF THE SHEEP DISEASE HEMORRHAGIC SEPTICEMIA, AND ITS CONTROL BY SERUM VACCINATION. H. Raebiger, A. Spiegel and K. Schern. *Deut. Tier. Wchnsch.* 1915.—A specific serum was obtained from three sheep which had been given repeated intravenous injections of a virulent strain of the *Bacillus ovisepticus*. The testing of the serum was carried out in the following manner: white mice after being inoculated subcutaneously with 1 c.c. of virulent 24-hour bouillon culture were injected intraperitoneally with doses of .2 c.c. and .3 c.c. of serum. The animals so treated were protected while the controls which received only the culture died.

In 13 large herds in which the disease was present the serum treatment gave very promising results. About half of the animals sick at the time of treatment recovered, and the spread of the disease among the healthy sheep was checked.

The serum was administered intravenously in doses varying from 5 c.c. to 10 c.c., the sick animals receiving the larger amounts.

A record of a case in a lamb held under observation for 26 days was kept. The symptoms first noticed were the poorly nourished condition, debility, uncertain, staggering gait, loss of appetite, at times a grinding of the teeth was heard, and there was a peculiar manner of holding the head such as is seen in "turn-sickness" of sheep. Later there was a serous discharge from the nose and eyes, swelling of the carpal and tarsal joints and a paralytic condition of the hind quarters. The specific microorganism was present in the eye and nose discharges.

On the 18th day after the beginning of these observations an improvement in condition appeared which continued until the 25th day, when a decided relapse occurred. There was great weakness, shallow and accelerated respirations, and the animal was unable to stand. It was killed on the following day.

The chief points of interest in the autopsy were the greatly emaciated condition of the carcass with a watery infiltration of the subcutaneous connective tissue and the appearance of grayish-yellow nodules varying in size from a lentil to a hazel nut, scattered over the surface, and in the deeper parts of the lungs. On sec-

tion these nodules are seen to contain a grayish-yellow, dry, cheesy material with softened centers, from which a creamy, greenish-yellow liquid may be pressed. They are set off from the healthy lung tissues by a grayish-brown connective tissue capsule. The *Bacillus orisepticus* was found in these lesions.

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ESOPHAGEAL OBSTRUCTION—ESOPHAGITIS FOLLOWING. Doct. G. Del Seppia. *Il Nuovo Ercol.*—Having partaken too gluttonously of a meal of bran and potatoes mixed, an eight year old horse showed all the symptoms of choking, which was easily diagnosed. The test of drinking water, eating, slobbering, swelling in the oesophageal region, the case was complete. Catheterism of the esophagus was then attempted with a long urethral catheter. It was readily introduced into the esophagus until arrival at the point where the swelling was observed on the outside of the neck, resistance was felt. Moderate, gradual pressure pushed it through the mass and suddenly the horse reared and the catheter pulled away. Drink was then offered, taken and swallowed with a little difficulty and it was thought that perhaps the obstruction had not been pushed into the stomach because of the catheter being too short. The next day with a two meter tube of hard rubber the catheterism was successfully performed. For a few days the animal seemed to have some trouble in deglutition but after that, recovery was complete.

A. LIAUTARD.

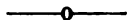
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BACTERIAL INFECTION AS A CAUSE OF RHEUMATISM AND ITS TREATMENT. F. E. Stewart. *Mulford's Digest.*—The term "rheumatism," defined as "an indefinite something induced by cold and exposure, always affecting either muscle or joint, and with pain on motion as a prominent symptom," has been much abused and sadly over-worked.

The researches of Poynton, Payne and Rosenow have done much to establish our knowledge of infectious arthritis including its cardiac and other complications.

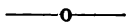
For the treatment of streptococcic rheumatism a polyvalent bacterin may be employed prepared from different strains of streptococci isolated from rheumatic cases, or a mixed or combined bacterin may be selected containing pneumococci, staphylococci and streptococci.

Success in the bacterin treatment of rheumatism is largely dependent upon proper attention to Wright's directions in regard to accessory treatment. Wright calls attention to the fact that failure may result if proper circulation is not secured in the infected area. Nature walls off the infected area to the best of her ability to quarantine it from the rest of the body. Frequently this wall greatly hinders the circulation of the blood in the part infected by living microbes, thus presenting a serious obstacle to bacterin treatment. Methods for producing hyperemia are therefore, often necessary.



MORTIFIED PROLAPSUS RECTI—REDUCTION—OPERATION—RECOVERY. Doct. G. Del Seppia.—A very young donkey had prolapsus of the rectum for several days. It was 35 centimeters long, forming a protrusion red in color. It had appeared after work. The author reduced it at once after cleaning, with lysoform. The prolapsus having returned a second time, pressure was applied against the anus with the tail, which was secured tightly with a surcingle. Finally the prolapsus returned a third time, worse than before and the mucosa of the rectum was soiled with feces, bleeding here and there and with excoriations and gangrenous spots. The treatment followed after the administration of chloral by rectum, was the introduction of a wooden tube, 25 centimeters long, 4 centimeters wide into the rectal vestibulum and held by an assistant. Another assistant pulled the rectum over the tube and as near as possible to the anus. It was then secured with an elastic ligature and 3 centimeters from the anus, the prolapsed portion of the rectum was amputated, and sutures were applied to unite the intestinal stump to the anus. The animal manifested a little pain towards the end of the operation. The wooden cylinder was removed. Careful liquid diet was recommended and after a few days the donkey had entirely recovered.

A. LIAUTARD.



CHONDRO-SARCOMATOUS GROWTH. Dr. Luigi Menicagli. *Il Nuovo Ercol.*—This occurred in an eight year old cow, far advanced in pregnancy. She had been affected for two months with difficult respiration, while at work. The animal presented the unique symptom of loud breathing, which became so pronounced that the owner who at first overlooked it, finally called on the author for advice.

The difficulty in breathing was manifested by a loud noise,

which sounded as if there was some impediment to the passage of the air through the nostrils. On examination of that portion of the face, there was found on the right side, a round tumor close to the lower angle of the nostril, smooth on its surface, ulcerated in two places and adherent to the cartilaginous septum of the nose. This growth was hard, not painful and to all appearance seemed to be part of the cartilage. The removal was performed with the bistouri. Abundant hemorrhage was arrested with thermo-cautery and recovery was complete after a few days. The examination of the growth showed its nature to be that of a chondro-sarcoma. A. LIAUTARD.

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INVESTIGATION INTO THE DISEASE OF SHEEP CALLED "SCRAPIE", WITH SPECIAL REFERENCE TO ITS ASSOCIATION WITH SARCOSPORIDIOSIS. T. P. M'Gowan, *I Vol.*, pp. 12-116, *Edinburgh, 1914*.—In a very extensive, well illustrated monograph M'Gowan has treated the subject in a splendid manner, and it is barely possible to consider the publication in a brief abstract. It is the result of an investigation which the author has undertaken at the suggestion of a commission which was appointed for the purpose of determining the cause of the enormous losses created by the disease in Ecosse County.

Clinically, the sheep show at the preferable age of two years a persistent pruritus with cutaneous eruptions; gradual emaciation; without diarrhea and loss in appetite; marked incorrelated locomotion (paralysis, trotting movements; lameness, etc.) The disease is always fatal.

M'Gowan thinks that "Scrapie" is the result of an infection with sarcosporidia, for the following reasons:

(1): Sarcosporidia are always present in the skeletal muscles of sheep suffering from "scrapie". The number is proportionally larger in advanced than in earlier cases.

(2): The pruritus, the main symptom of the disease, can be easily reproduced in the rabbit by injections with an emulsion of sarcosporidia.

(3): The clinical examination of atypical cases also reveals that the paralyzes are, in all probability, the result of primary lesions of the muscles.

(4): The autopsy—aside from an intensive invasion with sarcosporidia—is absolutely negative.

(5): No other hypothesis permits a better or more simple explanation as to the symptoms and the evolution of the disease.

"Scrapie" is hereditary on account of congenital infection. Numerous chapters are devoted to the discussion of the evolution of the sarcosporidia, the sarcosystine, etc.

So far, no treatment has been successful; the best method (on account of the hereditary transmission) consists in progressively replacing the ewes in infected herds by young female sheep from clean herds.

K. F. MEYER.

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PATHOLOGICAL INVESTIGATIONS INTO LAMZIEKTE. REPORT TO THE MINISTER OF AGRICULTURE, 1914. E. Hedinger, Dec. 1915; Pretoria, Gov. Printing and Stationery Office.—The nature of this disease in cattle, (resembling the foregoing discussed malady in sheep) which is very common in South Africa, causing heavy losses annually, has remained unknown, in spite of all the costly experiments which were undertaken by Theiler to support some of his elaborate hypotheses which he discussed in his article "Historical sketch of the investigations into lamziekte". (Report of Department of Agriculture. Union of South Africa. 1913-1914; pp. 123-129).

The work of Hedinger in this connection shows again clearly how fundamentally important and valuable a careful histopathological investigation will prove to the investigators of an unknown disease. If he lacks the basic knowledge of this science, or does not appreciate the efforts of his collaborators to study the disease anatomically, he involuntarily has to resort to speculations.

Prof. Hedinger, of the Medical Faculty of the University of Basel, (Switzerland), has been invited by the Department of Agriculture, Union of South Africa, to study the disease—after Theiler had blocked all the attempts of the various pathologists who worked in his laboratory to obtain the necessary material for a careful study of "lamziekte".

In 52 cases examined, Hedinger found degenerative lesions in the muscles, inflammatory changes in the nerves, and sarcosporidia. The correlation of these findings is expressed by the author in the following paragraph:

"Lamziekte is a disease which is very well characterized by histological changes of the cross-striated muscles, and in most cases of the nervous system, and by the presence of sarcosporidia. Although, owing to the incomplete knowledge of the sarcosporidia it is still not possible to prove experimentally the importance of the sarcosporidiosis for the lamziekte, it is quite possible, taking into consideration

the facts that are known about sarcosporidia, that these protozoa are the cause of lamziekte. The sarcosporidiosis explains without difficulty the whole nature of lamziekte. Be it that the sarcosporidia are or are not responsible for lamziekte, in all further investigations the question of the importance of sarcosporidia must have the first place".

K. F. MEYER.

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VERMINOUS THROMBOSIS OF THE MESENTERIC ARTERY CAUSES INTESTINAL OBSTRUCTION. Major Veterinary Cocu. *Bull. de la Soc. Cent.*—A stallion seven years of age, had generalized mange. He was in a very bad physiological condition. Notwithstanding every care and a ferocious appetite, while his skin disease was improving, he was still in a miserable condition and lost flesh. He only weighed 395 kilos. He still had a lively glance of the eye. his actions were always quick and well preserved, but the muscular emaciation was such that once when he was lying down he needed help to get up. An edematous swelling of the testicular region made its appearance, the loss of flesh was more accentuated, the horse was destroyed by military order. Post mortem. No essential lesions were found except in the right fasciculus of the mesenteric artery and its terminal branches. The coats of the intestines were pale and the mucous membrane showed little nests of embryos of sclerostomas and adult worms were found in great quantity. The right fasciculus of the artery was represented by a thick cord as big as the finger with indurated walls. Its cavity was contracted and partly obliterated by fibrinous clots and masses of worms. Under the colic and cecal serous covering, there were many old calcified emboli and also many capillaries were obliterated and transformed into small calcareous cylinders. All the other organs were healthy. A. LIAUTARD.

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TWINNING IN CATTLE, WITH SPECIAL REFERENCE TO THE FREE MARTIN: Leon J. Cole, *Science*, Vol. 43, p. 177, 1916.—A study of 303 multiple births in cattle, the records of which were obtained directly from breeders. Any female calf twinned with a male is referred to as a free martin. From a consideration of certain theoretical biological factors, Cole concludes that some free martins should be fertile while others are sterile. It was found that both classes exist. The work was done at the College of Agriculture of Wisconsin.

BERG.

RADIUM MUD IN SYNOVITIS AND TENDINITIS. Veterinary Major Marshall, *Bulletin de la Soc. Cent.*—1st observation. Articular and tendinous synovitis—Six year old mare, Henrietta, had no history but yet she showed cicatrices of distemper abscesses in the inter-maxillary space. After some little time, she became lame in the right hind leg with articular synovitis. Revulsive treatment and blisters gave no relief. The fetlock became involved, the metatarsophalangeal tendinous synovials were also diseased. For several months the mare was unable to do any work and became emaciated. The author then suggested the application of poultices made of radium mud.

From the first application round the fetlock, the mare manifested some relief. The swelling remained the same but the parts were not so painful nor so warm. A second application was made, and twenty-four hours after the mare could put her foot flat on the ground, and rested on it, the pain was considerably reduced to the touch, and lameness so far gone that the mare could be made to trot. Radio-active baths were ordered alternatively with the poultices. After ten days of that treatment the recovery was complete.

2d Observation. Tendinitis of the perforans tendon. Becoming suddenly lame in the right fore leg, the mare Falaise became disabled and not likely to be ridden for a while, much to the annoyance of her owner, who was going to manoeuvres in a few days. There was no doubt that at least nearly two months treatment would be required. She was treated with radium mud and after five days of direct applications of poultices and with radio-active baths, the mare was able to resume her work.

A. LIAUTARD.

LA REAZIONE DI BORET-GENGOU NELLA ROGNA DEMODECTICA DEL CANE. THE BORDET-GENGOU REACTION IN THE DEMODECTIC MANGE OF THE DOG). G. C. Sparapani. *Il Moderno Zooiatro*, 1915, May 30th; pp. 211-218.—It was demonstrated through the work of Gmeiner and Mettam that the *Staphylococcus aureus* is the most important factor in the pustular form of demodectic mange, and Alessandrini therefore stated that the demodex folliculorum has no pathogenic action on the host. The author, in attempting to form his own opinion on the subject, investigated several cases of mange by means of the complement fixation test and found that the blood of the affected dogs contained specific antibodies for the *Staphylococcus albus*. Positive reactions were noted only in dogs which

showed microscopically the cocci in the pus of the pustule contents. Negative results only were obtained with the serum of healthy animals and with that of dogs in which the pathological process was only caused by the mites. The reaction is, therefore, specific.

The staphylo-mycosis is not characteristic for follicular mange inasmuch as in other skin affections a similar invasion with staphylococci can take place.

Sparagini failed to find specific antibodies against the demodex by using macerations of parasitized skin particles as antigens.

The results prove the contention of Alessandrini that the demodex is non-pathogenic.

K. F. MEYER.

EXPERIMENTAL WORK. HOG CHOLERA SERUM AND VIRUS. REPORT OF THE VETERINARY DEPARTMENT. R. A. Craig. *Twenty-eighth Annual Report of the Purdue University Agricultural Experiment Station, Lafayette, Indiana.*—In order to determine the effect of heat on the potency of anti-hog-cholera serum, different lots of serum were heated in a water bath. The temperature to which the serum was heated varied in the different experiments and excepting in the first, both unheated and heated serum from the same lot was used in vaccinating the experimental pigs. The following table gives the number of experiments and a summary of the data of each test:

No. experiment	Temperature serum heated	Low dose pigs	High dose pigs	Pigs receiving unheated serum	Virus pigs	Result
I	40.5 degrees C. 1 hour	3	3		2	Serum potent
II	40.5 degrees C. 1 hour	3	2	2	2	Serum potent
III	50.0 degrees C. 1 hour	3	3	2	2	Serum potent
IV	50 to 53 degrees C. 1 hour	3	3	2	2	Serum potent
V	55 degrees C. 1 hour	2	2	2	2	Serum potent
VI	55 degrees C. 1 hour	2	2	2	2	Serum potent
VII	58 degrees C. 1 hour	2	2	2	2	Serum potent

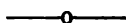
We were able to note the condition of a few of the pigs that were vaccinated with the heated serum several weeks after they had been released from the test, and it was noted that they did not thrive well. However, it could not be determined that the heated serum was responsible for their condition.

In Experiments I and II the serum (defibrinated blood) was carbolized before heating, and could not be heated to a higher temperature than 40.5 degrees C. without becoming thickened and coagulated. In the other experiments the preservative was added after heating.

An experimental vaccine was made by mixing hog-cholera blood and anti-hog-cholera serum together and heating the mixture in a water bath. Five-tenths of one per cent. carbolic acid was added as a preservative. The experimental vaccine was then tested by injecting into pigs weighing about fifty pounds. The following table gives a summary of the tests:

No. experiment	Per cent. virus	Per cent. serum	Amount injected	Result
I	80	20	1 c.c.	Failed to protect
II	70	30	1 c.c.	Failed to protect
III	60	40	1-2 c.c.	Failed to protect
IV	50	50	2-4 c.c.	Failed to protect
V	50	50	2-4 c.c.	Failed to protect
VI	40	60	2-4 c.c.	Failed to protect

Exposure check pigs that were not given the experimental vaccine were present in all of the lots. In from a few days to three weeks the pigs were subject to pen exposure, or inoculated with virus. One check and one vaccinated pig survived. As the pigs receiving the experimental vaccine lived about the same number of days as the checks, no immunity was conferred. REICHEL.



ECHINOCOCCUS CYSTS IN THE LUNGS CAUSE PNEUMOTHORAX IN A Cow. Henry B. Eve, M. R. C. V. S. *Veter. Journ.*—Aged cow in poor condition, bought at auction sale, was fed like the other cows, which were in a good condition. She kept away. She was dull, listless, with pale mucous membranes, had a discharge from eyes and nostrils, coat was staring, appetite capricious, gave very little milk which was watery, pulse was weak, breathing accelerated, temperature sub-normal. Auscultation revealed pneumothorax on both sides. She had a hacking cough, which was noticeable in the morning. The abdomen was relaxed and sometimes constipated.

Chronic emphysema was diagnosed. Tuberculin test was applied and was negative. Treatment consisted in tonics of all kinds. No improvement and death followed.

Post mortem: Numerous echinococcus cysts of the multilobular variety were found in the lungs. One was near the base of the right lung and had burst allowing the air to escape from the lung.

A. LIAUTARD.

ARMY VETERINARY LEGISLATION

It is strange that the practical soldiers of the General Staff and the Secretaries of War should be so slow to recognize the true worth of our profession and the great work that is now being done by the Army Veterinary Corps of the French, English, Italian, and the little known, but, surely efficient German army veterinarians. The latter being compelled to carefully conserve their horses on account of the actual blockade against imports.

However indifferent and cold the officers of our mounted (Artillery and Cavalry) service may have been in the past, I can see and hear much that shows a trend of opinion in our direction.

At a University banquet in Washington this winter a Major of Field Artillery emphatically stated that he was a radical believer in giving the veterinarian commission with rank in our army.

For the first time in the history of the American Army a veterinarian has been sent abroad to observe the work of the allied forces in France and he was the veterinarian whose work had molded the opinion of the officer quoted.

Both the upper and lower Houses of the 64th Congress now in session have bills preparing to give veterinarians advanced standing.

The first and most important one is known as the Hay bill (H.R. No. 12766, Union Calendar No. 92).

This bill in relation to its veterinary feature was similar to the one passed unanimously last year by the House after the great work of my predecessor on the legislative committee.

At this writing it is now on the Union Calendar and will follow the consideration of the Free Sugar bill.

The Senate bill (S. 4840) is called the Chamberlain bill.

CHAMBERLAIN BILL

SEC. 17. VETERINARIANS.—The President is authorized to appoint and commission by and with the advice and consent of the Senate, veterinarians at the rate of two for each regiment of Cavalry, one for each battalion of Field Artillery and mounted Engineers, and twenty-four for the Quartermaster Corps. Veterinarians thus appointed shall have the pay and allowances of second lieutenants, Veterinarians who have served seven years as such shall, subject to such examinations as the President may prescribe, have the pay and allowances of first lieutenants. Veterinarians who have served more than fifteen years as such, shall, subject to such examinations as the President may prescribe, have the pay and allowances of captains. Veterinarians who have served more than fifteen years as such shall,

subject to such examinations as the President may prescribe, have the pay and allowances of majors: *Provided*, That the total number of veterinarians with pay and allowances of majors shall not at any time exceed fifteen.

HAY BILL

SEC. 17. That the President is hereby authorized, by and with the advice and consent of the Senate, to appoint veterinarians and assistant veterinarians in the Army, not to exceed, including veterinary officers in service, two such officers for each regiment of Cavalry, one for every three batteries of Field Artillery, seventeen as inspectors of horses and mules and as veterinarians in the Quartermaster Corps, and seven as inspectors of meats for the Quartermaster Corps, and said veterinarians and assistant veterinarians shall constitute the Veterinary Corps and shall be a part of the Medical Department of the Army.

That hereafter a candidate for appointment as assistant veterinarian must be a citizen of the United States, between the ages of twenty-one and twenty-seven years, a graduate of a recognized veterinary college or university, and shall not be appointed until he shall have passed a satisfactory examination as to character, physical condition, general education, and professional qualifications.

That an assistant veterinarian appointed under this Act shall, for the first five years of service as such, have the rank, pay, and allowances of second lieutenant; that after five years of service he shall have the rank, pay, and allowances of first lieutenant; that after fifteen years of service he shall be promoted to be a veterinarian with the rank, pay, and allowances of captain: *Provided*, That any assistant veterinarian, in order to be promoted as hereinbefore provided, must first pass a satisfactory examination, under such rules as the President may prescribe, as to professional qualifications and adaptability for the military service; and if such assistant veterinarian shall be found deficient at such examination he shall be discharged from the Army with one year's pay.

That the veterinarians of Cavalry and Field Artillery now in the Army, together with such veterinarians of the Quartermaster Corps as are now employed in said corps, who at the date of the approval of this Act shall have had less than five years' governmental service, may be appointed in the Veterinary Corps as assistant veterinarians with the rank, pay, and allowances of second lieutenant; those who shall have had over five years of such service may be appointed in said corps as assistant veterinarians with the rank, pay, and allowances of first lieutenant; and those who shall have had over fifteen years of such service may be appointed in said corps as veterinarians with the rank, pay, and allowances of captain: *Provided*, That no such appointment of any veterinarian shall be made unless he shall first pass satisfactorily a practical professional and physical examination as to his fitness for the mili-

tary service: *Provided further*, That veterinarians now in the Army or in the employ of the Quartermaster Corps who shall fail to pass the prescribed physical examination because of disability incident to the service sufficient to prevent them from the performance of duty valuable to the Government shall be placed upon the retired list of the Army with seventy-five per centum of the pay to which they would have been entitled if appointed in the Veterinary Corps as hereinbefore prescribed.

That the Secretary of War, upon recommendation of the Surgeon General of the Army, may appoint in the Veterinary Corps, for such time as their services may be required, such number of reserve veterinarians as may be necessary to attend public animals pertaining to the Quartermaster Corps. Reserve veterinarians so employed shall have the pay and allowances of second lieutenant during such employment and no longer: *Provided*, That such reserve veterinarians shall be graduates of a recognized veterinary college or university and shall pass a satisfactory examination as to character, physical condition, general education, and professional qualifications in like manner as hereinbefore required of assistant veterinarians; such reserve veterinarians shall constitute a list of eligibles for appointment as assistant veterinarians subject to all the conditions hereinbefore prescribed for the appointment of assistant veterinarians.

That candidates for appointment as assistant veterinarians who shall have passed satisfactorily the examinations prescribed for that grade by this Act shall be appointed, in the order of merit in which they shall have passed such examination, to vacancies as they occur, such appointments to be for a probationary period of one year, after which time, if the services of the probationers shall have been satisfactory, they shall be permanently appointed with rank to date from the dates of rank of their probationary appointments. Probationary veterinarians whose services are found unsatisfactory shall be discharged at any time during the probationary period, or at the end thereof, and shall have no further claims against the Government on account of their probationary service.

That the Secretary of War shall from time to time appoint boards of examiners to conduct the veterinary examinations hereinbefore prescribed, each of said boards to consist of three medical officers and two veterinarians.

A comparison of the two will readily show that the Hay bill has our endorsement.

The confusion and delay in Congress on measures of national security are disquieting to the public and only such occurrences as the Columbus raid and massacre seem to stir up action.

The military affairs committees have been working independently and in some cases at cross purposes.

Their work will have to be done over again by Congress as a whole unless financial considerations are to be cast to the winds.

On the fundamental question of reconstructing the army there is such wide difference that a long struggle is possible. Right here is where our section 17 of both bills will be in the thick of the fight, especially in the Senate.

We expect little or no opposition in the House bill.

After two and a half months of committee work the chairmen wish to have their recommendations promptly acted upon.

The emergency defense bill raising the army strength to 120,000 was rapidly passed by both houses.

It is doubted in some quarters that Congress will be able to devise and fill out a comprehensive and coherent system of national defense within a year or two.

Certainly the lack of information shown by the law makers is in many instances very deplorable. Committees alone possess the information obtained at hearings and from department heads and their chairmen hold the respect of Congress on account of this knowledge of the subject being considered.

Right here is where our great friend, Hay, of Virginia, does his best for the Army veterinarian.

He knows full well the need of rank and authority and responsibility for our men and when he gives Congress his word that this must be a part of the new defense bill we feel more confident than ever, that it will pass.

It seems almost impossible of belief that after having had civil and foreign war experiences of our own, and with the daily object lesson of the European battle fields, Americans generally and their legislators in particular, should be so indifferent to our possible fate if unprepared.

When we stop in our mad rush for riches and luxury and ponder over our gigantic size and its helplessness, except to gain greater size and wealth, it is time to listen and reflect "on the first requisites to national defense without which we would be helpless."

Of course both bills cannot become law but must be referred to a conference committee composed of the two chairmen and three members each from the Senate and House.

DAVID E. BUCKINGHAM,

Chairman Legislative Committee.

[Just as this form is closing, news comes that the bill has passed the House.—*Editor.*]

PROCEEDINGS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

(Continued from page 783, March issue)

We further recommend that when an institution has failed for a reasonable period (in the judgment of this committee but not more than two years) to comply with what the committee deems important criticisms, and has made no material progress toward correction of the fault, then and thereafter such criticism shall be presented in open meeting and published in reports until such faults have been corrected or the association as a whole has had opportunity to consider and act on such criticisms.

SPECIAL INSTRUCTION:—We recommend that veterinary colleges not already doing so should adopt a definite plan of giving instruction to older students concerning professional business matters and including accounts, collections, dealing with the patron, professional ethics, public responsibilities and opportunities for service, etc.

RESPONSIBILITY FOR STUDENTS WELFARE:—We renew previous recommendations that veterinary colleges in general should definitely recognize their responsibility for social and moral welfare of the students just as other colleges do and make suitable provision looking to that end.

VETERINARY COLLEGES FOR RECOGNITION 1914-15:—It should be understood that our report in this connection has no bearing upon the colleges which have been recognized by the association in the past, but which are not now in active service.

We have already in this report called the attention of the association to the fact that a considerable number of previously recognized veterinary colleges have operated during the year 1914-15 in violation of section 2, article VIII. by-laws 1913, particularly regulations XI, XII and XIII relating to faculty, alumni, and requirements for certain specified major subjects, also in violation of section 3, of the same article relating to a matriculation requirement of one year high school or its equivalent. In some cases, the violation has been only of section 2, in most cases the violation has been of both sections 2 and 3.

This puts before our association a serious question concerning the position of a very large number of matriculants of the year 1914-15 with regard to eligibility for membership in this association.

Having these minor defects in mind, the committee have decided to suggest to the association that this condition is so general and the attention of all the schools being called to it in a very positive manner in the criticisms that the committee have made of the colleges, that we believe the matter will be taken care of in the future, by those colleges that have apparently overlooked this requirement.

The list of schools to be published for recognition in the forthcoming report will be determined by the action of the association and will be automatically constituted if the committee report concerning schools found not in violation be accepted and considered in connection with action of the association with reference to schools listed as in violation of by-law requirements.

UNIFORM MATRICULATION REQUIREMENTS:—Still under this general heading of recommendations we would respectfully call attention to the desirability of uniform matriculation requirements by the American Veterinary Medical Association, the Federal Department of Agriculture, and Civil Service Commission. Looking to this end the chairman of your committee has had some correspondence with these two bodies with encouragement that the question will be carefully considered. In fact, some progress has already been made apparently as a result of this correspondence.

A report has just been received from Mr. John McIlhenny, President of the United States Civil Service Commission under date of August 11th, advising us that after a conference with the Secretary of Agriculture that regulation I of the regulations governing entrance to examination for the position of veterinary inspector, Bureau of Animal Industry, Department of Agriculture, has been amended to read as follows, to become effective at the beginning of the 1916-17 session of veterinary colleges:

"1. A matriculation examination shall be adopted by each veterinary college, the minimum requirements of which shall be equivalent to the first grade examination as published in the United States Civil Service Manual of Examinations. Such examination will therefore comprise:

1. Spelling
2. Arithmetic
3. Penmanship
4. Report writing
5. Copying and correcting manuscript
6. Geography and civil government of the United States

2. An applicant having a diploma from a recognized college or normal or high school, or a first-grade teacher's certificate, shall be eligible for admission to a veterinary college without examination.

It is not deemed advisable to make this amendment effective at once, as colleges have already made their arrangements for entrance classes for the coming school year.

By direction of the commission:

Very respectfully,

J. A. McILHENNY, President."

Our governmental authorities could hardly be expected to come to any unusual standard required by this association unless that standard fitted closely to their needs. But, on the other hand our association could easily modify its standards so as to harmonize with theirs, providing they are willing to adopt satisfactory elevations of matriculation requirements.

We recommend that this association should now take definite steps and make persistent effort to bring about uniformity of requirements by these bodies, either by appointment of a special committee or special authorization of an existing committee.

The chairman of this committee now offers as a motion that this report be referred to the executive committee for consideration of its recommendations.

Committee:

GEO. W. DUNPHY

P. H. BROWNING

M. H. REYNOLDS, Chairman.

COMMENTS

We deem it wise to call attention of this association to certain features of American Medical Association work.

First, that this association maintains a permanent "Council on Medical Education" as a rather stable body, term of membership, five years, one member retiring annually.

A. M. A. maintains very close college inspection and is very exacting in its requirements.

The A. M. A. asks for a specified number of thoroughly trained specialists on laboratory branches, giving entire time to instruction and research work, anatomy being included as one of the laboratory subjects.

The A. M. A. is insisting more and more on abundant hospital facilities and clinical opportunities and the use just as far as possible of the laboratory method of teaching.

The A. M. A. insists on the need of good library facilities, specifying quite definitely number and character of periodicals, housing, accessibility, etc.

The A. M. A. adopted several years ago a classification of medical colleges into four clearly defined groups, grading medical colleges (and publishing) somewhat as a modern city dairy inspector might grade dairies and publish official gradings.

What would the American Veterinary Medical Association think of this plan? Your committee does not think it best to make recommendation to this effect at present but would very much appreciate the benefit of a free discussion.

RECOMMENDATIONS

MATRICULATION:—In our last recommendations (see proceedings for 1913) we urged the desirability of steady and reasonably rapid improvement in matriculation requirements in order that our profession may come up as rapidly as possible to the matriculation requirements of other professional colleges. This recommendation we now renew. To illustrate this point concerning our present inadequate matriculation examination and requirements the following is submitted. This is copied exactly from an examination written for the Minnesota Examining Board by a recent graduate of one of our older and well established schools. Comments appear quite unnecessary excepting that license was of course refused, and that as every examining board member knows, such cases are not rare.

On total of three arithmetic problems which any pupil who has finished the eighth grade work should have solved, his answer was marked as zero for each of the three.

In response to question on history, "What do the stars and stripes of the U. S. flag represent?" his answer, quoting exactly, was "Libatory, when George Washington gained the independence for the United States."

In response to the question, "Name the capital cities of the thirteen original states," he answered: "St. Paul, Minnesota; Springfield, Ill.; Pear, South Dakota; Bismark, North Dakota."

In response to the question, "Name the martyred presidents of the United States," he answered, "Willison" (Evidently Wilson).

His total rating on all common school subjects was 17.5 on a basis of 100.

In response to question calling for a letter of not less than fifty

words and not more than one hundred words, subject of letter to be "Report on Illegal Veterinary Practitioners in Your Locality," he answered:

Candidate No. 129.

"St. Paul, Minn., July 13, 1915.

"Minnesota State Veterinary Exam, Board.

"Dear. Sir.

"As I am practicing at.....and am practicing Veterinary Medicine, I find that there is a quack at.....sixteen miles south which is doing work and making charges for his services. It would be a great pleasure to me a great help if the Minnesota State board would tend to this matter.

(Copied exactly)

In 1904, less than 20% of our American Medical Colleges required more than full high school course for matriculation. In 1911, 33% required one or more years of collegiate work. Later figures are not available.

PRESIDENT MARSHALL: Gentlemen, you have heard the report. What is your pleasure?

DR. KINSLEY: I move that the report be accepted and referred to the executive committee. Seconded by Dr. Hoskins.

PRESIDENT MARSHALL: Any remarks to be made in regard to referring the report of the committee on colleges to the executive committee? If not those in favor make it manifest by saying "aye"; those opposed "no". Carried. It is so ordered. That finishes the program for the morning. Before we adjourn, let us fix the time for meeting in the morning. It is scheduled at 9:30. The executive committee has a good deal of work to do yet. I think if you make it ten o'clock that the executive committee will be ready to report at that time.

If there is no objection, we stand adjourned until ten o'clock to-morrow.

Oakland, Calif., September 2, 1915.

The fifth business session of the fifty-second stated meeting of the American Veterinary Medical Association was called to order by the President, Clarence J. Marshall, at ten o'clock A. M.

PRESIDENT MARSHALL: Gentlemen, the executive committee is still in session. They won't be through for half or three-quarters of an hour, but in order to start the meeting on schedule time we will not wait for the committee. They will report later.

The first thing on the program this morning is the report of Dr. Hoskins, Secretary of the Special Committee on Salmon Memorial.

Dr. Hoskins then read the report of the committee as follows:

SALMON MEMORIAL COMMITTEE.

Mr. President and Members:

Having accepted at your hands the post of secretary of the Salmon Memorial Committee and in that capacity having communicated with the other members of your appointment, as well as the reviewing of the extensive communications on this subject that brought forth expressions of favor from representatives of a large proportion of the state associations, some local veterinary organizations, the Bureau of Animal Industry, national organizations, as well as a number of the local branches of this body, with many expressions of individual interest, and a wealth of suggestions, all showing the deepest interest in perpetuating this good man's name, all of which have been considered by your committee, we beg leave to present for your consideration the following suggestions:

First: that the Salmon Memorial Fund shall be undertaken by this body and that a stated committee will be appointed by this organization for the carrying out of the purposes of this movement.

Second: that the form of testimonial shall be of an educational character, that may cover a scholarship, a fellowship, or some advanced or special work of interest or import to the veterinary profession, as may from time to time be recommended by this committee for action of the association.

That to this end a sum of monies of not less than ten thousand dollars be raised by popular subscription from the upwards of seventeen thousand of veterinarians in North America; this money to be invested under the direction of this association so that the income of four or five hundred dollars may be annually awarded to some one or more along the lines above referred to.

That said scholarship or fellowship shall be in an American Veterinary College, and if a fellowship, not to be taken in the college of which the successful person awarded the same shall be a graduate thereof.

To this end, Mr. President, I am authorized by a committee of Pennsylvania Veterinarians to guarantee the sum of five hundred dollars from that state or one-twentieth (1-20) of the sum of any amount that may be determined upon.

I am equally assured by representatives of the New York State Associations that they will raise the sum of five hundred dollars.

Many other states have already raised sums of monies for this purpose and some states are endeavoring to secure a contribution from each practitioner in their respective states.

Monies already contributed are in the hands of a number of state custodians waiting some specific action by this body.

I have here a telegram saying that the Ohio Association voted one hundred dollars for the Salmon Memorial.

Respectfully submitted,

W. HORACE HOSKINS, Secretary.

(See the October 1915 number for a more extended report).

PRESIDENT MARSHALL: Gentlemen, you have heard Dr. Hoskins's report. What do you wish to do with it? Is there any discussion? This is an important matter and I hope you will discuss it thoroughly, and that some definite plan will be offered. If any of you wish to speak on the subject, I will be very glad to hear from you.

DR. MURPHEY: Mr. President, that kind of a memorial appeals to me very much. It seems to me a permanent committee should take it in charge, not only to secure the subscription, but also to decide upon the sort of fellowship to be given along with representative lines of work; not necessarily the same kind of work every year, and not necessarily the same school, but that the matter should rotate and that the investigation work provided for should be done under the masters which we have in this country. I think that one of the greatest handicaps to veterinary education in this country has been the lack of fellowships for students who do not have the ability or means to pay for their own sustenance during the time the work is being done.

DR. HOSKINS: Mr. Chairman, the committee deemed it wise to leave the form which the memorial might take, entirely to the recommendations of the association, to be taken up from year to year by the association, and not to recommend any one specific line whatever; for instance, Dr. Murphey might come in and make a recommendation to the association that would be referred to that committee to investigate, and the following year the work could be carried on in that direction if so desired.

I think there should be the widest latitude as to what is the best way. It might be that some young man, a son of a veterinarian, whose father might be sending him through school, might come to the second year without funds, and it might be that \$200. or \$300. would help that man through, so we think the committee ought to have the widest latitude in this respect. Naturally we have received a great many suggestions from all over the country in respect to this memorial. Some have advocated a memorial statue, or a memorial arch, or something of that kind, but that sort of memorial did not appeal to the committee whatever. It did not seem to be in accord with the wonderful life which Dr. Salmon led, and the wonderful work which he did. It seemed to the committee that if he had had the planning of it, it would be something along the line to advance veterinary education, and we believe the committee should work in that direction.

PRESIDENT MARSHALL: I would like to ask Dr. Hoskins if the committee worked out any plan for a permanent committee, so that the different organizations throughout the country should be combined into an efficiently working whole.

DR. HOSKINS: No, Mr. Chairman, we did not work out any plan, but I have one in mind, and if the incoming administration should see fit to assign me to a place on that committee, I should take up the labor with the keenest delight and pleasure.

As I said in my tribute to him, I have spent thirty-five years of my life in close touch with the man, and a better man never lived in our country.

We have numerous committees already who are taking up this matter with great enthusiasm, and they are waiting now for some concrete directions from this body. Some have gone ahead and done work and collected money, but I have asked them to postpone any definite action as to how the money should go until this body should act and make some general plan.

DR. TYLER: The Doctor in his last few remarks touched upon the very point I wish to refer to. Some little time ago the Southern Auxiliary of the California Association received a communication from a coterie of veterinarians, I believe, from Boston, Massachusetts or somewhere in the East, asking for a contribution to this fund. Well, we did not know what we ought to do, but our secretary was instructed to notify the gentleman who did the writing that when the matter took a concrete form we were ready to remit. I do not think that condition is confined to our society alone. I think it holds good in others, and it is my judgment that it will be necessary to have some permanent committee—somebody to whom the money shall be sent, and who will see that it is properly spent. We stand ready to contribute to this fund to the very best of our ability.

DR. FOX: Speaking in behalf of the California Association—The Northern Association, our association also received a communication similar to the one Dr. Tyler has just mentioned. A resolution was passed, after we received this communication, and we advised the person who wrote the letter that we would lend our moral support as soon as the time came when a permanent committee was in charge of this movement, and that we would also lend our financial support, and so we have been waiting, as have many others, until we knew that the committee had been appointed by this body to take charge of the matter and see that the fund raised is properly handled. You may expect hearty co-operation from the California Association.

DR. RUTHERFORD: Mr. President, although I do not belong to the United States, I feel that this association and the members of the veterinary associations generally, not only in North America, but throughout the world, owe it to themselves as well as to the late Dr. Salmon to perpetuate his memory in a fitting and becoming manner. Dr. Salmon was the man who put into concrete form and rendered possible the effective Organization of Veterinary Sanitary Service of Meat Inspection in the English speaking world. He was the first man who brought order out of chaos in that connection. His work has been a model from which subsequent work of a similar character has been planned and carried out. Speaking for myself, I may say that had it not been for the great work which has been already done by Dr. Salmon, at Washington, the task of attempting to organize a Veterinary Sanitary Service of Canada and the Meat Inspection Service of the country would have presented greater

obstacles—almost unsurmountable obstacles which would have rendered the work which has been done along that line in Canada much more difficult and unquestionably, when completed, much less perfect. I feel satisfied that the very best way in which the name of Dr. Salmon can be perpetuated in the veterinary profession is that which has been suggested by Dr. Hoskins. We have already seen that method practiced in the old world, as well as in the new. And again, we have seen statues erected and pictures hung commemorative of great men, but these are local, and after one generation has passed—perhaps even before one generation has passed,—the great bulk of the people who were interested in the career of that man, have lost touch with his memory. Having a Salmon Memorial Scholarship, or Fellowship, and having a Salmon Memorial Fund, which will be known and recognized through the world, the memory of Dr. Salmon will be kept green and fresh, not only in the minds of those who knew him, but in the minds of all those who are to come. I therefore take very much pleasure in moving that the memorial to the late Dr. Salmon take the form as suggested by Dr. Hoskins as chairman of the temporary committee. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: The motion has been made and seconded that the suggestions made and read by Dr. Hoskins, chairman of the temporary Salmon Memorial Committee, be adopted as suggested by him.

DR. FAUST: Mr. President, I would like to state that at a meeting of the New York State Veterinary Society a committee was appointed with power to work in conjunction with the committee that should be appointed by this association.

PRESIDENT MARSHALL: Any others to speak on this question? Personally I have received letters from a number of different people interested in this question and it is the general feeling that the national association should take the lead in concentrating the work of this memorial. I would be very glad to see the recommendations of the committee accepted.

All those in favor of the acceptance of the recommendations as made by the committee, make it manifest my saying "aye". Those opposed "no". Carried. It is so ordered.

Now, as I understand the recommendation there is no definite way settled upon for the selection of that committee. Is it to be elected or appointed? Would it be well to have it stated how this committee should be selected?

DR. HOSKINS: Our committee felt about that, Mr. Chairman, that we ought to leave that to be determined by the body and not make any specific recommendation.

I do believe, Mr. President, that if the resolution is adopted along the line we propose the committee ought to be a committee appointed or elected for five years. That when charged with that duty it might require five years for the committee to get the sum required but it would be possible to report each year, how much money was available and let the association make such recommendations as it might see fit. I believe that committee ought to have some degree of permanence.

(To be continued)

FROM THE OFFICE OF THE SÉCRETARY OF THE A. V. M. A.

Table showing the proportion of alumni of various colleges with respect to membership in the American Veterinary Medical Association.

Name of College	No. Alumni	No. Members	% Members
San Francisco Veterinary College	198	74	37 plus
Univ. of Pennsylvania, Vet. Dept.	628	181	28 plus
New York State Vet. Col. at Cornell	370	103	27 plus
Washington State Vet. College	69	17	24 plus
Iowa State Vet. College	309	60	19 plus
Alabama Polytechnic Vet. College	82	15	18 plus
Colorado Veterinary College	68	12	17 plus
U. S. College of Vet. Surgeons	247	42	17 plus
Kansas City Vet. College	1311	202	15 plus
Indiana Vet College	541	79	14 plus
Ohio State Univ., Vet. Dept.	527	76	14 plus
Cincinnati Vet. College	284	38	13 plus
St. Joseph Vet. College	145	13	8 plus
Grand Rapids Vet. College	467	23	4 plus
Michigan Vet. College	13	0	0 plus

The number of alumni of the following colleges who are members of the American Veterinary Medical Association has been compiled from the records of the secretary of the above association. The total number of alumni of these colleges has not been obtained.

College	No. Members in the A.V.M.A.	College	No. Members in the A.V.M.A.
Ontario Veterinary College.....	383	St. Joseph Vet. College.....	13
Chicago Veterinary College.....	290	Colorado Vet. College.....	12
Kansas City Veterinary College..	202	Ohio Vet. College.....	10
Univ. of Pennsylvania, Vet. Dept.	181	Laval University	10
New York City, (Various Colleges	156	Detroit Col. of Med., Vet. Dept.	8
McKillip's Veterinary College..	114	M. R. C. V. S. London.....	8
New York State Vet. Col., Cornell	103	Terre Haute Vet. College.....	8
Indiana Vet. College.....	79	Columbia University.....	7
Ohio State Univ., Vet. Dept.....	76	National Vet. College.....	6
San Francisco Vet. College.....	74	M. R. C. V. S. Glasgow.....	5
Iowa State Vet. College.....	60	M. R. C. V. S. Edinburgh.....	5
Montreal Vet. College.....	55	Veterinary School of Berlin....	5
U. S. Col. of Veterinary Curgeons	42	California Univ., Vet. Dept.....	4
Cincinnati Vet. College.....	38	Stuttgart Univ.	2
Harvard Univ., Dept. of Vet. Med	31	New Vet. College.....	2
Geo. Washington Vet. College...	25	Vet. College, Tokio.....	2
Grand Rapids Vet. College.....	23	National Vet. College, France...	2
Washington State Vet. College...	17	Royal Vet. College, Copenhagen.	2
Kansas State Ag. Col., Vet. Dept	16	Various Vet. Colleges represented	
Alabama Poly. Inst., Vet. Dept.	15	by one member.....	17

TO QUALIFIED VETERINARIANS

Detroit Meeting Are you planning to be present at the meeting of the American Veterinary Medical Association to be held in Detroit, August 21, 22, 23, 24, and 25? All veterinarians of good reputation who are graduates of recognized colleges are cordially invited to attend this meeting. The convention will probably be the largest meeting of veterinarians ever held and the program will excel any hitherto given.

Program Several papers of exceptional interest have already been selected. The clinic will be a special feature this year and will occupy the entire day. Operations on carefully selected cases will be supplemented by lectures and demonstrations, and it is proposed to conduct a question box and open discussion in conjunction with the clinic.

Entertainment On account of the day of entertainment to be provided by Parke, Davis Company, it has been necessary to extend the time of meeting to include Monday, August 21st. In addition to the meeting and clinics there are many attractions in Detroit of special interest to veterinarians. The Local Committee of Arrangements is perfecting plans to enable the visiting veterinarians and their families to enjoy these to the utmost.

Improve Your Practice If you are meeting with success in your practice you cannot afford to miss this convention. The association includes most of the successful practitioners in the United States and Canada. In fact, it is the largest veterinary organization in the world.

Get Out of Your Rut If you are not entirely satisfied with the size of your practice or your present location you certainly should go to the Detroit meeting where you will have the opportunity to meet your colleagues from widely separated fields, get new ideas from personal acquaintances which may open opportunities for advancement and wider practice.

Keep Up With Your Profession If you are unable to attend the Detroit Convention, you may still have the privilege of reading the proceedings as published in the Journal of

the American Veterinary Medical Association which comes out each month to all members of the association in good standing. This Journal, formerly the American Veterinary Review, and recently purchased by the association, has been enlarged and improved. No veterinarian, whether practitioner or inspector, can afford to be without it. In order to retain the confidence and respect of the modern stock-raiser, it behooves every veterinarian to keep right up to the minute on the discussion and developments and discoveries that are new in his profession.

Inquire For literature and information concerning the American Veterinary Medical Association, address the Secretary. C. M. Haring, University of California, Berkeley, California.

CHANGE OF ADDRESS

	OLD	NEW
Becker, Chas. J.	Scottsboro, Ala.	To 108 Jefferson Co. Savings Bank Bldg., Birmingham, Ala.
Cleveland, W. J.	Galt, Ia.	" Havelock, Ia.
Curtis, W. A.	Plainview, Tex.	" Bureau of Agriculture, Manila, Philippines
Davis, L. B.	827 E. Girard Ave., Philadelphia, Pa.	" Twin Oak, Clementon, N. J.
Earl, W. B.	1113 E. 11th St.	" 3741 Broadway, Kansas City, Mo.
Graff, P. L.	Rolla, N. D.	" Bisbee, N. D.
Krieger, Robt. E.	Ray, N. D.	" Williston, N. D.
Lapple, Edw.	23 Fed'l Bldg., Kansas City, Kans.	" 132 Exch. Bldg., Sioux City, Ia.
Lombard, C. M.	Stock Yards, Chicago, Ill.	" 4502 Emerald Ave., Chicago, Ill.
Lothe, Herbert	Sharon, Wis.	" Waukesha, Wis.
McDonnell, L. E.	Hankinson, N. D.	" Audubon, Minn.
McFarland, C. M.	217 Fed'l Bldg., Spokane, Wash.	" 230 Exch. Bldg., Sioux City, Ia.
Mitchell, A.	Manila, Philippines.	" 3d Field Artillery, Ft. Sam Houston, Tex.
Rich, T. S.	Pueblo, Col.	" 1477 W. Grand B'l'vd, Detroit, Mich.

SOCIETY MEETINGS

THE COLORADO VETERINARY MEDICAL ASSOCIATION

The Colorado Veterinary Medical Association held its annual meeting at the rooms of the Gentlemen's Riding and Driving Club in Denver, Colorado, on January 18th. It was attended by the largest number of Colorado veterinarians which have attended any previous meeting.

One important item of business was the apparent oversight of the law makers in leaving the veterinarian out of consideration in formulating the prohibition measure which went into effect on January 1st. Apparently under the law the veterinarian has the same right to obtain alcohol or any alcoholic substance that any other citizen has, but is not given the special consideration which is extended to physicians. A committee was appointed to consult with the Attorney General on the matter in order that relief might be had. Six new members were elected.

Dr. A. P. Drew, President of the Association, took up the matter of "Milkweed Poisoning in Cattle", a disease which has become quite prevalent in the vicinity of Grand Junction. He gave details of a number of cases where it was quite apparent that poisoning had been due to this weed (*Asclepias verticillata*). He had sent a considerable quantity of the weed to the Experiment Station where alcoholic, glycerine and watery extracts have been made and tested on rabbits without any evident results. Not only did this disease seem to affect cattle but was also supposed to kill sheep.

Dr. G. C. Lamb gave a very interesting discussion of the proceedings of the U. S. Live Stock Sanitary Boards, and the special meeting called by Secretary Vrooman to consider foot-and-mouth disease.

The paper entitled "Sundries", which brought out a discussion of Azoturia and of ulcers of the intestine of dogs due to streptococci, was given by Dr. C. W. Dickey.

"Sanitary Police Control of Hog Cholera" was given by Dr. R. H. Bird. He advocated much more stringent measures on the part of the state sanitary authorities in controlling hog cholera, and pointed with pride to the results of such control in the San Luis Valley.

Dr. Lamb, State Veterinarian, being present admitted that more control was needed in order to eradicate the disease, but he

contended that the impetus must come from the hog raisers themselves, and that they must take an active interest in the matter if any permanent results were to be secured. He pointed out that the eradication of the disease in the San Luis Valley was due to the efforts of the growers themselves rather than any regulations made by the state.

Dr. C. C. Stewart discussed "A Pneumonic Condition in Young Calves" in his district, giving the symptomatology and asking for more information.

"Perforated Bowel in the Horse" was discussed by Dr. A. P. Drew, and accompanies this communication. (See Case Reports.)

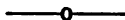
Dr. V. J. Ayers discussed some unusual cases that had occurred in his practice.

Dr. J. D. Paxton had a paper on a peculiar disease of hogs which the members present were unable to diagnose.

The election of officers resulted as follows:

F. D. Hylton, Longmont.....	President
L. R. Dillon, Pueblo.....	1st Vice-President
T. H. Quinn, Greeley.....	2nd Vice-President
I. E. Newsom, Ft. Collins.....	Secretary-Treasurer

The next meeting will be held about the first of June at Fort Collins.



MISSOURI VALLEY VETERINARY ASSOCIATION

The semi-annual meeting of the Missouri Valley Veterinary Association held in Kansas City, Mo., February 1st, 2nd, and 3rd, was marked by an unusually large attendance and a program of scientific interest and practical value. About 170 members and 200 visiting veterinarians registered, in addition to a large number of students from the Kansas City and St. Joseph Veterinary Colleges. Thirty-one new members were added to the roll.

The scientific program was as follows:—"Why the Horse Has Colic More Often Than Other Animals", by C. L. Wilhite; "Some Legal Phases of Veterinary Practice", by D. M. Campbell; "Equine Laminitis", by R. C. Moore; "Poisoning of Animals", by N. S. Mayo; "Greater Accuracy in Clinical Diagnosis", by R. R. Dykstra; "The Anatomy of Cryptorchids", by S. L. Stewart; "Some Things That Happen to Serum Producers and Serum Users", by E. K. Glover; "Kansas City's New Milk Ordinance and how it Operates", by W. H. Phipps; "Observations on the Treatment of Jacks

and Jennets", by Stanley Smith and H. C. Carver; *Neurobacillosis in Pigs*", by S. W. Alford; *"Hemorrhagic Septicaemia"*, by Chas. Murray; *"Hemorrhagic Septicaemia in the Form of Mad Itch"*, by J. T. Brown; *"Does Infectious Pneumonia (Swine Plague) Exist in this Country"*, by A. T. Kinsley. Case reports and general discussions of the papers presented added much to the interest and value of the program.

The third day was devoted to the clinic and a splendid demonstration of bovine splanchnology by S. L. Stewart. A specially prepared subject was used in which all important visceral structures were demonstrated by electric illumination and their positions and surgical and physiologic importance explained by appropriate remarks. Clinical cases were handled by Drs. Jos. Hughes, J. S. Anderson, J. V. Lacroix and others. An interesting demonstration of a new rectal injection appliance was given by Dr. O. B. Morgan. This syringe is inserted and held in place by exhausting the air from within the rectum, the same negative pressure serving to inject water into the bowel. The apparent advantages of the appliance lie in the simplicity of its operation, the safe degree of pressure applied and its automatic retention. From 10 to 12 gallons of water can be injected into the average horse.

During the regular session a resolution urging the passage of the Lobeck Bill upon members of Congress and another commending the plan for preparedness of the veterinarians of the United States for military service, as presented to the association by Dr. R. Vans Agnew of the 5th U. S. Cavalry, were adopted.

R. F. BOURNE, Secretary.

THE ALABAMA VETERINARY MEDICAL ASSOCIATION

The ninth annual meeting of the Alabama Veterinary Medical Association was held at Auburn in the Veterinary Department of the Alabama Polytechnic Institute February 18th and 19th. There were twenty-five veterinarians present, mostly from Alabama, and seventy veterinary students, a number of agricultural students and a few farmers.

President Andrade in his address called attention to the fact that Alabama has made considerable progress in the last year by securing the passage of a Veterinary Practice Law. He also reviewed the progress of the veterinary profession in general.

The first paper read was that of Dr. W. W. Webb on abortion,

In speaking about the causes of abortion Dr. Webb stated that many of the cases enumerated in the text books were rarely if ever factors in the production of abortion. He seemed inclined to think that infection and mechanical injuries of various kinds covered the greater number of causes of abortion.

The next paper was that of White and Williams on White Diarrhea in Chickens. The paper considered the coccidian variety and also the more troublesome type due to bacterium pullorum. This paper was a review of the literature on the subject and presented nothing new or original.

Dr. C. W. Ferguson gave the anatomical reasons why solipeds are more subject to colic than other domestic animals. This paper led to a somewhat spirited discussion of the technical definition of colic.

King and Harget read a paper on the toxic effect of black locust on domestic animals. They first gave a review of the literature on the subject and then gave results of their experimental tests upon horses and cats. The toxalbumen found in the bark of this tree is soluble in ten per cent solution of salt and when given to an animal dissolved in this strong salt solution some of the purging action that may be attributed to the toxin may be due to the salt. This was especially brought out in the effect of the drug upon a cat. Some one stated that this toxalbumen affected animals similar to belladonna. This is doubtful except for one or two things. It appears to dilate the pupil but its action on the heart appears to be entirely different from that of belladonna.

Dr. Geo. R. White gave an illustrated stereopticon lecture on cryptorchids. The illustrations and the explanations were very plain and thoroughly enjoyed by the members of the association.

Dr. O. R. Eatman next reported a fatal case of volvulus of the small intestine.

Dr. L. E. Beckham reported several cases of parturient paresis where the affected cows failed to get down yet were cases of this disease; they made a rather speedy recovery.

Dr. I. S. McAdory reported a case of injury of the external part of the radial region in which there was rupture of the popliteal and possibly the posterior radial arteries. He illustrated this case by using the limb of a "sub" to show the parts affected.

Dr. C. C. Middleton reported a case of intestinal calculus and presented the broken calculus to the meeting. He stated that the

animal passing this calculus had been fed on some sugar feed and it appeared that the calculus was made up of deposits of crystallized sugar about a small central stone. The calculus was turned over to the veterinary department for analysis to determine its composition.

Dr. T. B. Gissendanner reported a case of low tenotomy. He stated that the separated parts of the tendon had failed to unite.

Dr. L. F. Pritchett gave a short paper on the chief characteristics of Bursati. He seemed to think that a diagnosis of Bursati could be made by the peculiar odor that is associated with it, its recurrence in the animal, being confined to the skin and subcutaneous tissue and its temporary disappearance or subsidence during cold weather. He gave no permanent remedy but suggested that excision of the affected parts as often as possible might keep it down. Dr. White suggested in the discussion that the application of equal parts of tincture of iodine and chloride of iron would remove the kunkurs and infection at a given place but that it was liable to return in some other part of the body.

Dr. J. R. Readon gave a synopsis of government inspection of serum plants.

On the night of February 18th the Veterinary Medical Association of the Alabama Polytechnic Institute entertained the Alabama Association at a banquet. At this banquet there were about 150 in attendance and to say the least, it was one of the most enjoyable features of the meeting.

On February 19th the whole day was devoted to a polyclinic. Dr. Geo. White was chief operator, doing more operating than any other veterinarian present. He castrated three colts standing, one mule in the recumbent position, operated on one cryptorchid boar, one boar with scrotal hernia and spayed one bitch. He also used his restraining apparatus on nearly all the animals operated on with the exception of one that was placed upon the Simplicity Operating Table. That case was tenotomy of the deep flexor tendon in a four year old stallion, the operation being done by C. A. Cary. A number of cases of lameness were presented to the veterinarians present who made diagnosis and recommended treatment. Some of the cases presented were navicular arthritis, side bones, gonitis and one of the interesting cases presented was a fracture or dislocation of the atlas and axis in a roan horse. The surprising feature of this case was that the animal was living, carried his head to one side but was unable to move the neck with any degree of safety. This case was discussed at length.

The veterinarians making examinations, diagnoses and suggesting treatment were Doctors Middleton, Howle, Lambert, Beckham, Eatman, Andrade, Gissendanner, Kearley, Cook and others. A very interesting case presented itself in the midst of this clinic by the appearance of a darkey with a three year old colt that had a choke in the thoracic part of the esophagus. This choke was due to the animal bolting cowpeas in the hull. A rubber tube was passed by Dr. McAdory, locating the choke in the thorax. In all there were about twenty cases presented for the polyclinic.

The officers elected for the ensuing year were: President, Dr. R. I. Kearley, Andalusia, Alabama; Vice President, Dr. L. E. Beckham, Tuscaloosa, Alabama; Secretary-Treasurer, Dr. C. A. Cary, Auburn, Alabama.

C. A. CARY, Secretary.

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VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY
(December Meeting)

The regular monthly meeting of the association was called to order by the President, Dr. H. D. Gill at 9 p. m.

The minutes of the November meeting were read and approved.

The secretary read a letter from Mr. Augustus S. Downing regarding the new registration act.

Dr. W. H. Hoskins of Philadelphia, Pa., was introduced and gave a very interesting address on the operation of the veterinary law in Pennsylvania. He stated that thirty-nine states now have veterinary laws and hopes that in the near future a federal certificate will be recognized by all the states throughout the union thereby enabling one holding such certificate to practice in any state. In doing this some states whose laws are quite severe would have to modify the same to some extent.

These remarks of Dr. Hoskins were well received as they brought out many instructive points regarding the operation of veterinary law in Pennsylvania.

The question was asked "What makes a dog dream happy dreams?"

Dr. Hirscher gave it as his opinion that this condition is due to impressions of the mind similar to that same condition in children, who often in their sleep will reenact their play and sports.

A number of the members discussed this subject citing different cases relative to the same.

The secretary and treasurer's report was then read. The auditing committee examined the records and certified the same. This report was, on motion, unanimously received, and ordered placed on file.

Dr. Hoskins at this time spoke of the Salmon Memorial Fund and eulogized the late Dr. Salmon in the highest terms. He spoke of his being a Cornell student and later of his twenty-five years service as chief of the Bureau of Animal Industry which he organized and directed.

He explained that at the last meeting of the A. V. M. A. it was decided to raise a fund of ten thousand dollars with which it is proposed to establish a memorial which will probably be of an educational nature, in the form of a scholarship or fellowship for deserving veterinary students or for research work in animal diseases.

There are thirteen thousand veterinarians in the United States and if each would contribute a dollar it would be more than enough for this worthy object. Dr. J. G. Rutherford of Canada, is a member of the A. V. M. A. committee and is taking up the work in that country.

This being the annual meeting the election of officers for the ensuing year then took place and resulted in the following gentlemen being elected: George J. Goubeaud, President; A. Silkman, Vice President; Robert S. Mac Kellar, Secretary and Treasurer.

Dr. Gill the retiring president thanked the association in a few well chosen words for the honor conferred and the support given him during the past year.

Dr. Goubeaud was then installed as president and also thanked the association for the honor, and asked for the cooperation and support of every member to make the coming year a success.

Under new business Dr. McKinney brought up the subject of fake remedies and mentioned one in particular which had recently been brought to his attention.

Dr. Hoskins said that the best way to combat this evil is to analyze the so called remedy and publish the formula. Action can also be taken by the district attorney on the charge of mislabeling.

Two or three good papers were promised for the February meeting.

No further business appearing the meeting adjourned.

ROBT. S. MACKELLAR, Secretary.

(January Meeting)

The regular monthly meeting of this association was called to order by the President elect, Dr. Geo. J. Goubeaud at 8:45 p. m.

The roll of members was called and change of addresses noted.

The minutes of the annual meeting held in December were read and approved.

The president announced that he had appointed the following gentlemen to act as a prosecuting committee, Dr. R. W. Gannett, Chairman, Dr. D. W. Cochran, Dr. Wm. J. McKinney.

Dr. Gannett as chairman said that the committee had held two meetings and arrived at the conclusion that there is a great deal of illegal practice going on and think it best to secure the services of a detective to obtain evidence in these cases.

The prosecuting committee up to the present time have received voluntary contributions amounting to a considerable sum.

Dr. Gill stated that the question of financing the committee should be carefully considered and suggested that a fund should be raised for this purpose.

It was moved by Dr. Geo. H. Berns that the prosecuting committee be authorized to solicit funds from legally registered practitioners—seconded and unanimously carried.

The privilege of the floor was at this time extended to the visitors present.

Dr. Kornobis spoke of the advisability of working in harmony with the State Board of Education in all matters of prosecution.

Dr. Griessman said he was pleased to hear that the prosecuting committee proposed to obtain the services of a detective agency for the purpose of obtaining evidence.

Dr. Berns also endorsed this method of obtaining evidence.

Dr. Gannett stated that he had the assurance of the Assistant Attorney General that he would bring action when evidence was presented.

Dr. McKinney moved that the prosecuting committee be empowered to employ a detective to obtain evidence—seconded by Dr. Berns.

There was quite a lengthy discussion of this motion and Dr. Chase offered as an amendment to Dr. McKinney's motion that the prosecuting committee be empowered to employ a detective to assist them in obtaining evidence against illegal practitioners and that payment for such services shall be made out of a fund raised by the prosecuting committee—seconded and carried.

The motion as amended was then adopted as a whole.

The prosecuting committee stated that a full report of all transactions would be rendered to the association.

Dr. William Gall of Matawan, N. J., and Dr. David McAuslin of Brooklyn, N. Y., were proposed for membership and ordered referred to the board of censors.

Dr. Griessman spoke of revising the by-laws for the purpose of allowing different forms of membership in the association such as associate and fellow members.

Dr. Chase moved that a committee be appointed to revise the by-laws—seconded—not carried.

Dr. McKinney moved that a certain sum be given the prosecuting committee out of the treasury. This motion was seconded but not carried.

The answer of the Internal Revenue Department regarding the matter of P. Harvey Flynn was read by the secretary—ordered acknowledged and placed on file.

A letter from Dr. J. G. Wills, chief Veterinarian of the Department of Agriculture in answer to the letter addressed to the Commissioner of Agriculture regarding the list of approved veterinarians was also read, ordered acknowledged and placed on file.

Resolutions endorsing the work of Dr. Charles Duncan in Autotherapy and recommending him for the Nobel prize in medicine were, on motion, by Dr. Corwin—duly seconded and unanimously carried.

Dr. Duncan who was present sincerely thanked the association for the action taken in this matter.

Dr. Geo. J. Goubeaud then read an article he had prepared entitled the "Illegal Practitioner".

The doctor went into this subject very thoroughly and in an emphatic and convincing manner.

Dr. Louis Griessman then read an interesting paper on "The Use of the X-Ray in Veterinary Medicine", and exhibited a large number of photographs of normal and pathological conditions.

The president appointed the following gentlemen to serve as a board of censors: Dr. D. W. Cochran, Chairman; Dr. Geo. H. Berns, Dr. Max. Danziger, Dr. Thos. E. Corwin, Dr. P. Burns.

The following gentlemen were also appointed to serve as a judiciary committee: Dr. Thos. E. Corwin, Chairman; Dr. W. Reid Blair, Dr. Chas. E. Caulfield.

A unanimous vote of thanks was tendered Drs. Goubeaud and Griessman for their contributions to the programme of the evening.

No further business appearing, the meeting adjourned.

ROBT. S. MACKELLAR, Secretary.

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MICHIGAN STATE VETERINARY MEDICAL ASSOCIATION

The meeting of the Michigan State Veterinary Medical Association was held at Lansing, February 8 and 9. After the meeting was called to order by President Erwin an address of welcome was delivered by Mayor Reutter and responded to by J. P. Hutton. This was followed by the president's address after which there were reports from resident secretaries, standing and special committees.

In the evening there was a banquet presided over by Toastmaster C. C. Mix. The following took part in the speech-making: President F. L. Kedzie, subject, "M. A. C."; Mayor Reutter, subject, "Lansing"; G. W. Dunphy, "Responsibilities"; Reuben Hilty, "A. V. M. A."; H. H. Halladay, "Michigan"; Judson Black, "The Veterinarian"; H. L. Schuch, "Qualifications"; H. M. Gohn, "Our Duties"; J. S. McDaniel, "Anything"; J. H. Blattenburg, "Ohio"; W. R. Harper, "The Farmer".

On the 9th there were papers and discussions on surgery and surgical operations; the new veterinary law; the handling of contagious diseases throughout the state, etc. Drs. W. J. R. Fowler of Toronto, G. W. Dunphy, J. Black, N. S. Mayo and others took part.

The 1916 officers and board of directors of the Michigan State Veterinary Medical Association were elected as follows:

President, Geo. W. Dunphy.....	Lansing
First Vice President, F. M. Blatchford....	Brighton
Second Vice President, A. B. Curtice.....	Hillsdale
Third Vice President, J. S. McDaniel....	East Lansing

BOARD OF DIRECTORS

H. M. Gohn, St. Johns.....	Six Years
G. D. Gibson, Adrian.....	Five Years
J. P. Hutton, East Lansing.....	Four Years
H. M. Armour, Chelsea.....	Three Years
Judson Black, Richmond.....	Two Years
A. McKercher, Lansing.....	One Year

The officers and board of directors constitute the executive committee.

Owing to the fact that the 1916 A. V. M. A. meeting will be held at Detroit the Michigan Association will hold no mid-summer meeting, as every effort will be put forth to make the A. V. M. A. meeting a most successful one.

Our annual meeting was exceptionally well attended and one of the best the association has ever held.

W. AUSTIN EWALT.

HUDSON VALLEY VETERINARY MEDICAL SOCIETY

The last meeting of this Society was held at the Hotel Lincoln, Hudson, N. Y., February 2, 1916.

The meeting was called to order by the President, Dr. Comstock. There were about 20 members present. After the regular routine business had been gone through, the disease influenza was discussed.

The members present entered heartily into the discussion. It seemed to be the consensus of opinion of those present that the use of phylacogen and the use of the various vaccines were of very little use. Some of the members reported some very interesting cases; namely, one veterinarian reported losing as high as 22 out of 24 horses, and on post mortem examination in each and every case a condition of the liver was found similar to those of horses which have been used for the production of diphtheritic antitoxin.

Others reported peculiar instances where the structure of the kidneys had been broken down.

It seemed to be the consensus of opinion of the veterinarians present that the treatment of influenza in this locality should be largely stimulants and good hygiene.

It was also brought out in discussion that influenza oftentimes appears differently in different localities.

It was voted to hold the next meeting at Poughkeepsie, when the disease discussed will be indigestion.

The meeting was adjourned, and after adjournment there was a banquet held in the dining room of Hotel Lincoln.

WM. HENRY KELLY, Secretary.

THE IDAHO ASSOCIATION OF VETERINARY GRADUATES, BLACKFOOT, IDA.

Our meeting would have had better attendance if the weather had permitted, but it was a good one as the spirit was present if not the body.

We had quite a lengthy discussion on the *Taenia Fimbriata* in sheep along with the Foot and Mouth disease by Dr. Robert Dill of the B. A. I. There were also papers given by Dr. Freeman, Dr. Williams, Dr. Smith and Dr. White.

Our meeting for this year was held at Drs. White & Williams Veterinary Infirmary, Blackfoot, Idaho, on February 4th and 5th. The next meeting of the association will be held at Boise, Idaho, on the same dates for the year 1917.

The following officers were elected: E. E. McDaniels, D. V. M., St. Anthony, President; R. P. Smith, D. V. M., Wendell, Vice President; C. V. Williams, D. V. M., Blackfoot, Secretary; J. H. Plank, D. V. M., Rupert, Treasurer.

C. V. WILLIAMS, Secretary.

COMMUNICATIONS

SALMON MEMORIAL FUND

Editor Journal of the American Veterinary Medical Association:

If not encroaching too much upon your valuable space, I would like to offer a few words in commendation of the work of the committee on the Salmon Memorial fund, and to urge the hearty co-operation and support, (not only of the members of the American Veterinary Medical Association, but of the entire American veterinary profession) of the active and untiring efforts of the secretary-treasurer of that committee, that indefatigable worker, Dr. W. Horace Hoskins. His carefully prepared and energetically executed plans are bearing fruit in a most encouraging manner. His plan of securing one hundred subscribers at twenty-five dollars each has progressed so well, that he has launched his second plan, calling for two hundred and fifty subscribers of ten dollars each. Of course there is no limit to the number who may subscribe in either class, but the doctor wants at *least* to reach the goal which he has set as the *minimum*, when he probably would make a third appeal to a still larger class, for a smaller amount each. And, while but five months remain between now and the time of the Detroit meeting, still, if every member of the profession will but rally to the support of the committee *now*, to whatever extent they feel able, the committee will be in a position at the Detroit meeting to report the fund raised, and take counsel with the association as to how best to invest it so as to have it earn the annual amount required for the scholarship to a student of veterinary medicine or fellowship to a veterinarian, as explained in the letter recently sent out from the secretary-treasurer's office of the Salmon Memorial Committee.

Ten thousand dollars has been estimated by the committee as the minimum amount required to insure an income sufficient for the foregoing plans; and surely it should be possible to raise that amount if the veterinary population of North America, (seventeen thousand) has been correctly estimated by the committee, or even if there are only half that number.

But what should be borne in mind by the profession is, that *prompt response to the call* is going to be a tremendous assistance to the committee in carrying out this work that has been assigned them by the national organization. A man's *intentions* may be the very best, but his *subscription* means that his part in assisting in the work has been *done* and the committee can check him off and direct its efforts elsewhere.

I do not think for a moment that the "cause" needs any boosting, especially with the members of the veterinary profession whose privilege it has been to have known the late lamented Daniel Elmer Salmon during any part of his more than a quarter of a century's service as a federal officer in the interests of the livestock industry and a pure food supply in this country.

They know what Dr. Salmon's broad-gauged capability and moral fibre have done for the uplift of the profession. They fully appreciate the effect that his modest demeanor and fine personality has had in impressing the American public with what constitutes a veterinarian. No man can measure the full extent of the uplifting influence of such an one, as our representative for twenty-five years at the head of the veterinary service in the United States Department of Agriculture.

These men have honored him while he lived by electing him to the highest office in the gift of the American veterinary profession: that of president of the American Veterinary Medical Association, which he dignified, and filled to their entire satisfaction. They will feel it a *privilege* now that he has been taken from them by death (at an age when they had every reason to believe he should have remained with them for many years more), to participate in an act that is to immortalize his name. A reminder, however, that now is the time to avail themselves of that precious privilege, may not be out of order. For a number of years prior to Dr. Salmon's death, he was engaged in the work of establishing a veterinary school, and in veterinary educational work in Uruguay, South America, during which time and since, hundreds of new members of the profession have joined our ranks; and it is to them that I would like to address a few words of appeal to *get themselves in line* in this commendable object, that they may *share* with their older confreres, the privilege of being participants in honoring the name of a man that they should feel proud to refer to as having been a member of *their* profession. It has been my privilege to know personally this great man, whose name had been

familiar to me since my earliest association with matters veterinary. Even before I had joined the ranks of the profession, in my early days as a student, I used frequently to hear the name of Daniel Elmer Salmon from preceptor and professors, always respectfully and earnestly referred to; that being at the very inception of the U. S. Bureau of Animal Industry of which he was the first chief; and later it was my privilege to enjoy a personal friendship with him. While many of our younger members can never have the privilege referred to, they may still avail themselves of subscribing to the fund that is to keep his name green down through the generations that are to come. Just how *great* a privilege that is, they can gauge by the very high esteem in which Dr. Salmon has been held by his professional brothers during all his lifetime amongst them and the reverence with which his memory is held by them to-day. The thought of a memorial to the name of Dr. Salmon sprung up in Massachusetts among the loyal members of his profession there, and was then taken up by the American Veterinary Medical Association, and thereby given a *national* aspect; which is most fitting, as Dr. Salmon's work, and uplifting influence was never less than nation-wide.

It is the writer's opinion too, that the *form* of the memorial proposed—being educational in character—will strongly appeal to the younger generation of veterinarians who have been launched into the profession on the ship of higher education. Personally I regard as a peculiarly fitting testimonial to the name of a man who had by his life-work, exerted such an uplifting influence upon his profession, a memorial that shall, while perpetuating his memory, at the same time perpetuate his educational and uplifting influence upon the members of his profession that come after him in the succeeding generations.

Very sincerely yours,

ROBERT W. ELLIS.

FROM BRAZIL

The following extracts are taken from a personal letter received from an old member of the A. V. M. A., Dr. J. A. McNeil, chief veterinarian for the Brazil Land, Cattle and Packing Co., Sao Paulo, Brazil.

"I have had an experience with the foot-and-mouth disease here. As a constant thing it is not pleasant to deal with. The cattle are of such small value that the ranchers and breeders do little or nothing to treat it, or prevent its spread.

"In all the Latin-American countries where I have ever been, the Urubu (Buzzard) is the bird of paradise, and they carry all kinds of disease from ranch to ranch—a God-send that they have them. I presume, as they keep many of the villages or cities habitable. They clean up both front and back yards for them—but you know what they are from experience. You are no doubt aware that the

condition in all these S. A. countries does not appear to be as rosy as before the outbreak of the war in Europe, as the governments are in poor financial circumstances.

"To my mind conditions have been wildly exploited; Kabel, Brice, and the host of writers have grossly misrepresented things, even Teddy in his series of articles in Scribner's is not consistent. He insists that all that region at 10° and north to the equator, or that part through which he traveled, will in time be a great farming and stock raising country, still the country is so destitute and barren that they can hardly get through with pack mules and oxen, (no grasses), and hosts of pests, screw worms, ticks, etc. From my four years here I would not care to do any pioneer work in that region, it is not a place for white men.

"The matto, or wooded land there, as here, is really all that is of any account, and on account of such heavy rainfall and heat the brush must be cut out each year and your land or farm reclaimed, almost an endless job. You will probably think that I have dipped my pen in the aloes bottle, but I would not have my friends think that this country is an Eldorado or promised land. Of all the books on Brazil and S. A., the late lamented Joe Wing's book "In Foreign Fields" is the best it has been my pleasure to read. He hits the nail on the head almost every time; some few things I cannot agree with him in, but in all essentials he is sound. My observations have not been as extensive as his, but in some sections I have made up in length of time. His advice relating to the American farmer and laborer is mighty good. I have seen many clean-cut Americans, English, and Germans tramping through this country—absolutely no work for them to do, and the labor proposition here is something frightful—no good. But enough of this.

"I hope the A. V. M. A. will have a well attended meeting at Detroit this year. Hardly think it possible that I will return by that time, as I want to stop in the Argentine for several months after leaving here.

"We are still living in Parana Stata, and hope we can maintain this residence for several months yet. It gets pretty hot here, and all things are not quite as we would like to have them. This climate is much better than Matto Grasso in which to live; i. e. (for the white man). We have nearly all of the pure bred cattle here, although ultimately all will go, or be sent, to Matta Grasso as the most of the land owned by the company is in that state. I have some mighty fine Hereford and Shorthorn calves grown in this country. The young, especially the late calves fever badly. The earlier born ones, June, July and August seldom fever in a fatal form, and do not suffer from Dermotobia Noxalis, as do many born late in the season."

N. S. M.

REVIEWS

A TEXT-BOOK UPON THE PATHOGENIC BACTERIA AND PROTOZOA

JOSEPH MCFARLAND, M.D.

Professor of Pathology and Bacteriology in the Medico-Chirurgical College,
Philadelphia.

Eighth edition, thoroughly revised. Octavo of 807 pages with 323 illustrations,
a number of them in colors.

Philadelphia and London: W. B. Saunders Company, 1915. Cloth \$4.00 net.

Although bacteriology and protozoology are comparatively new sciences, they have developed in so many different directions that it is no longer possible to prepare a text book that adequately covers the entire field. Bacteriology has found its way into such a variety of human activities that the student of human medicine, veterinary medicine, dairying, agronomy, sanitary science and certain of the industries, each require a treatise containing in addition to the general technique, classifications and principles of bacteriology, certain definite information about microorganisms immediately associated with their respective subjects. While there is considerable overlapping the subject matter to be specifically dealt with in each instance is quite different from that in any of the others.

Dr. McFarland has developed a text book on the subject of bacteriology, including certain pathogenic protozoa, that is of unusual interest and value to the student of human medicine. This eighth edition contains 40 well defined chapters. The ones on structure and classification of microorganisms, biology of bacteria, infection and immunity are exceptionally well presented, although the subject matter of the others is well arranged and clearly stated. In a subject so large and so rapidly developing as bacteriological technique, there is opportunity for differing with any author. While exceptions may be taken to certain of the methods set forth in this volume, it is doubtful if, on the whole, a better selection could be made.

In separate chapters the bacteria of each of the specific infectious diseases of man are carefully described and in many instances very well illustrated. Among these are such diseases as tuberculosis, glanders and actinomycosis that are of special interest to the veterinarian. The chapter on tuberculosis takes up the preparation of tuberculin and gives a somewhat complete description of the bovine and avian varieties of tubercle bacteria. He also discusses in this connection a number of the acid fast bacteria that are more

or less liable to be mistaken for those of tuberculosis. The protozoa are restricted to those pathogenic for man.

The organic structure of the book is highly commendable. The style is clear and the space devoted to the various topics is well proportioned. In selecting data from the vast literature on this subject the author has exercised keen discriminating power and presented only that which seems to be of the most importance. The references to the literature are not numerous but sufficient for a text book. The illustrations are good, well chosen and instructive.

This book has had a phenomenal growth due undoubtedly to the care with which each successive edition has been written. It has unfolded the new developments of the science and its application for the medical student. It has now become somewhat large for a text book, yet one fails to find paragraphs that could well be omitted. Its fullness, however, is an advantage especially when it is used by competent teachers.

There are a number of minor points on which opinions may differ as to the interpretation of the phenomena and in certain instances slight changes suggest themselves. However, these are in connection with topics that are as yet more or less controversial. As the author is a teacher of high standing, the subject matter is presented in a manner adapted to the needs of medical students. It is difficult to suggest how a greater number of important bacteriological facts could be more fully and concisely presented. Although the book is written primarily for medical students it contains a great volume of information on the role bacteria play in nature's economy. It is to be highly commended to students and practitioners of human medicine and others interested in the subject of medical bacteriology. The author is to be congratulated. The publishers have done their part in making it an attractive volume.

V. A. M.

News has reached us of the death of the wife of Dr. C. Douglas McMurdo at Fort Huachuca. She was horseback riding with the Doctor and was suddenly stricken, fell from the horse and when reached by the Doctor in about five seconds, was dead. She had suffered from heart disease for some time. She was a devoted mother to their three children and much esteemed at the various posts where the Doctor had been stationed in his long career in the Army Veterinary Service.

MISCELLANEOUS

The state of Alabama recently dedicated a \$25,000 laboratory for making serum and virus for the treatment of hog cholera at Auburn.

Dr. Malkmus, of the Hanover Veterinary School, is at the front with the army. He, in 1913, was the first to bear the title of Rector of the school. Prof. Dr. Frick has succeeded him to the title.

Dr. Aquila Mitchell, formerly in the Philippines, is now stationed with the 3d Field Artillery, Fort Sam Houston, Texas.

Dr. J. V. Prucha of the Bureau of Animal Industry, stationed at Cleveland, Ohio, has been transferred to Denver, Colo.

The next meeting of the North Carolina Veterinary Medical Association will be held June 21 and 22 at Wrightsville Beach, N. C. The State Board Examination will be held June 20, 1916.

The mid-winter meeting of the Montana Veterinary Medical Association was held at Bozeman, Montana the last of January. Dr. F. S. Gray of Great Falls, was elected president; Dr. A. J. Dufrene of Glendive, vice-president; and Dr. A. D. Knowles of Missoula, secretary-treasurer.

The short course for veterinarians at the University of Minnesota opened with an attendance of 40. Dr. D. S. White of the Ohio State University and Dr. F. F. Brown of Kansas City were scheduled for lectures.

The next meeting of the Southern Illinois Veterinary Medical and Surgical Association will be held in August, 1916 at Centralia, Ill. Much interest and enthusiasm is shown and the association is growing rapidly.

Among the recommendations of the Medical Health Officer of Vancouver, Canada, is one that all meat intended for human consumption be inspected by a government veterinary inspector. Another is that all private slaughter houses be abolished and all cattle intended for consumption be sent, on the hoof, to a public abattoir, where they may be thoroughly examined before and after killing by a properly qualified government veterinary inspector, because, with the organs removed it is difficult to determine the condition of health.

Bulletin 102, of the Georgia State College of Agriculture of Athens, Ga., announces a Veterinary Degree Course. Freshman and sophomore work of a four-year course, leading to the degree of

D.V.M. is now offered for the first time. By the time students have completed the freshman and sophomore work the purpose is to offer the complete course.

THE SALMON MEMORIAL FUND. It is estimated that it will require about three years to raise the \$10,000 planned as the principal of this fund. While it is hoped that the balance may be raised this year, anyone so desiring may make his contribution payable in two installments, a portion payable this year and the balance in 1917.

CURRENT REPORT

Brownell's Dairy Farmer states that the address of Dr. W. L. Williams on "Contagious Abortion in Dairy Cattle," delivered to an audience of Michigan livestock breeders, has attracted widespread attention.

The dogs of the Army hospital service have had a hospital provided for them in Jena, Germany and already a number of dog patients have been treated there for wounds and various ailments. The hospital was built by convalescent soldiers. So far during the war dogs have rescued at least 3000 wounded soldiers who otherwise would have perished.

It is reported that as the law now stands Wisconsin farmers will not be paid, after this year, for animals reacting to the tuberculin test.

Roy C. Whitsell of the Indiana National Guard has been appointed veterinarian of the field artillery battalion.

It has been recommended that public watering troughs in Pittsburgh be closed for a time on account of the presence of glanders in horses.

The death of Emil Meyer, formerly a veterinarian, is reported to have occurred at the Lebanon hospital New York City in March.

There is a bill pending in the Lower House of the Legislature of Mississippi requiring the state veterinarian to make his headquarters at Jackson, Miss.

The Rockefeller Foundation has granted an additional endowment of \$1,000,000 needed in connection with the Department of Animal Pathology at Princeton, N. J.

Dr. Blattenberg, with an interpreter, planned to accompany Dr. C. J. Marshall on his European trip to study veterinary conditions in the war camps in England and France.

VETERINARY MEDICAL ASSOCIATION MEETINGS

In the accompanying table the data given is reported by many Secretaries as being of great value to their Association, and it is to be regretted that some neglect to inform us of the dates and places of their meetings.

Secretaries are earnestly requested to see that their organizations are properly included in the following list:

Name of Organization	Date of Next Meeting	Place of Meeting	Name and Address of Sec'y
Alabama Vet. Med. Ass'n.	1916 Feb. 18-19	Auburn	C. A. Cary, Auburn
Alumni Ass'n College of Vet •Med. O. S. U.....	.....	Columbus.....	W. R. Hobbs, care O. S. U. Columbus, Ohio.
Alumni Ass'n, N. Y.-A. V. C	1916	141 W. 54th St.	P. K. Nichols, Pt. Richmond
Alumni Ass'n U. S. Coll. Vet. Surgeons	April 15, 1916..	Wash., D. C....	C. M. Mansfield, Wash, D. C.
American V. M. Ass'n.....	1916 Aug. 22-25	Detroit, Mich....	C. M. Haring, Berkeley, Cal.
Arkansas Veterinary Ass'n.	1916	Little Rock	R. M. Gow, Little Rock
Ass'n Médéciale Veterinaire Française "Laval".....	1st and 3d Thur of each mo.	Lec. Room, La- Val Un'y, Mon.	J. P. A. Houde, Montreal
B. A. I. Vet. In. A., Chicago	2d Fri. each mo.	Chicago	Chas. E. Schneider, Chicago
B. A. I. Vet. In. A., S. Omaha	3d Mon. each mo.	S. Omaha, Neb..	E. J. Jackson, So. Omaha
Buchanan Co. Vet. Ass'n...	Monthly	St. Joseph.....	F. W. Caldwell, St. Joseph, Mo.
California State V. M. Ass'n	June 14, 1916..	Los Angeles....	F. M. Hayes, Davis.
Central Canada V. Ass'n....	Feb. and July..	Ottawa	A. E. James, Ottawa.
Central N. Y. Vet. Med. Ass'n	June and Nov..	Syracuse	W. B. Switzer, Oswego.
Chicago Vet. Society.....	2d Tu. each mo.	Chicago	D. M. Campbell, Chicago.
Colorado State V. M. Ass'n.	June, 1916....	Fort Collins....	I. E. Newsom, Ft. Collins
Connecticut V. M. Ass'n....	1916	Greenwich	A. T. Gilyard, Waterbury
Delaware State Vet. Society	Jan. Ap. Jul. Oct.	Wilmington	A. S. Houchin, Newark, Del.
Essex Co. (N. J.) V. M. A....	3d Mon. each mo	Newark, N. J....	J. F. Carey, E. Orange, N. J.
Genesee Valley V. M. Ass'n.	.....	Rochester	O. B. Webber, Rochester.
Georgia State V. M. A.....	1916	Savannah.....	P. F. Bahnsen, Americus
Hamilton Co. (Ohio) V. A....	.....	.....	Louis P. Cook, Cincinnati
Hudson Valley V. M. A....	.....	Hudson	W. H. Kelly, Albany.
Idaho Ass'n Vet. graduates.	1917, Feb. 4-5..	Boise	C. V. Williams, Weiser
Ilmo Vet. Med. Ass'n.....	1916	E. St. Louis....	L. B. Michael, Collinsville
Illinois State V. M. Ass'n..	1916	Chicago	L. A. Merrillat, Chicago.
Indiana Veterinary Ass'n....	1916	Indianapolis ..	A. F. Nelson, Indianapolis
Iowa Veterinary Ass'n.....	1916	Des Moines....	H. B. Treman, Rockwell Co.
Kansas State V. M. Ass'n..	Jan. 2-3, 1917.	Wichita	J. H. Burt, Manhattan.
Kentucky V. M. Ass'n.....	Oct. & Feb....	Lexington	Robert Graham, Lexington
Keystone V. M. Ass'n.....	2d Tu. each mo	Philadelphia ..	Cheston M. Hoskins.
Lake Frie V. M. Association	Pending	Pending	Phil. H. Fulstow, Norwalk
Louisiana State V. M. Ass'n.	1916	Lake Charles ..	Hamlet Moore, N. Orleans
Maine Vet. Med. Ass'n....	1916	Augusta	H. B. Westcott, Portland
Maryland State Vet. Society	.....	Baltimore	H. H. Counselman, Sec'y.
Massachusetts Vet. Ass'n....	4th Wed. ea. mo.	Young's, Boston	E. A. Cahill, Lowell, Mass.
Michigan State V. M. Ass'n.	1916	Lansing	W. A. Ewalt, Mt. Clemens
Minnesota State V. M. Ass'n	.....	St. Paul	G. Ed. Leech, Winona.
Mississippi State V. M. Ass'n	1917 Jan. 10, 11	Clarksdale	E. S. Norton, Greenville.
Mississippi Valley V. M. Ass'n	Semi-Annually	Galesburg, Ill..	G. E. McIntyre, Alexis, Mo.
Missouri Valley V. Ass'n....	1916 Feb. 1, 2, 3	Kansas City, Mo.	R. F. Bourne, Kansas City.
Missouri Vet. Med. Ass'n....	1916	St. Louis	Chas. D. Tolse, Kansas City
Montana State V. M. A....	1916 Jan. 28, 29	Bozeman	A. D. Knowles, Missoula
Nat'l Ass'n B. A. I. Employees	1916	New York, N. Y.	S. J. Walkley, 185 N. 7th Ave., Milwaukee, Wis.
New York S. V. M. Soc'y....	1916 Aug. 2-4..	Ithaca	C. P. Fitch, Ithaca, N. Y.
North Carolina V. M. Ass'n.	1916, June 16..	Wrightsville Beach, N. C..	J. P. Spoon, Burlington.
North Dakota V. M. Ass'n..	1916 July	Fargo	W. J. Mulroony
North-Western Ohio V. M. A.	1916	Toledo	Paul E. Woods, Ottawa
Ohio State V. M. Ass'n.....	.....	Columbus	F. A. Lambert, care O. S. U. Columbus, Ohio.
Ohio Soc. of Comp. Med.....	Annually	Upper Sandusky	F. F. Sheets, Van Wert, Ohio
Ohio Valley Vet. Med. Ass'n	.....	.....	J. C. Howard, Sullivan.
Oklahoma V. M. Ass'n.....	Fall, 1916....	Omaha City....	C. E. Steel, Oklahoma City
Ontario Vet. Ass'n.....	1916	Toronto	L. A. Wilson, Toronto.
Pennsylvania State V. M. A.	.....	.....	T. E. Munce, Harrisburg

JOURNAL

OF THE

American Veterinary Medical Association

Formerly American Veterinary Review

(Original Official Organ U. S. Vet. Med. Assn.)

PIERRE A. FISH, Editor

ITHACA, N. Y.

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VOL. XLIX. N. S. VOL. II.

MAY, 1916.

No. 2.

Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary C. M. Haring, University of California, Berkeley, California. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

TELEGRAM

April 17, 1916.

Senate passed amendment giving rank, including major, for veterinarians.

(Signed) D. E. BUCKINGHAM, Chairman.



VETERINARY LEGISLATION FOR THE ARMY

Veterinarians all over the country should be under a debt of gratitude to Congressman Hay for having carried the Veterinary Section of the Army Bill through the house for the third time.

In the Senate, efforts are being concentrated to amend the Senate bill toward a more favorable attitude to the veterinarians. It is evident, however, that a very severe struggle is involved. The demands of the Dental Surgeons have not been pleasing to the Senate Military Committee and this has not predisposed the committee favorably in their attitude toward the veterinarians. We understand that the Senate bill at first took away rank from the Chaplains but that this was later restored. The social influence and prestige of the protesting clergy apparently had an influence

upon the committee. If the influence of the clergy has been favorable upon their representatives in the Senate it is likewise possible that the appeals from veterinary colleges and veterinarians generally may have a similar favorable bearing upon their representatives. We understand that a number of such appeals has been made and we trust will be productive of much good.

The Army Veterinarians should have rank and commission and their anomalous position terminated. If failure occurs in the Senate, it is hoped that what has been conceded in the House may be secured in conference. It is, nevertheless, gratifying to note that in both the House and the Senate, there is apparently a tendency to appreciate the necessity of giving recognition to the veterinarians. Pressure is effected by numbers. If all veterinarians will do their duty in the matter the pressure will be too great to resist. .

P. A. F.

[The foregoing editorial was already in type and the form nearly ready for the press when Dr. Buckingham's welcome telegram was received. Thanks are due the legislative committee and Dr. Hoskins, who has cooperated with it, and to the many veterinarians who contributed to the pressure, in securing this much desired and just result.—EDITOR.]

"ABOVE ALL NATIONS IS HUMANITY"

The first and greatest asset to an individual is life itself. Correlated with it is the pursuit of happiness. In the war-torn countries of the old world neither is at a premium. The scourge is widespread and all classes are affected. In the midst of it all and because the effects are so general, it is possible that the veterinarians of this country are prone to overlook, in the general disaster, the particular needs of their brother practitioners in these devastated areas. Many have lost not only a thriving practice but even their families and homes and the only asset left them is life itself. Such cases may perhaps be found in all the countries affected, but undoubtedly some are more seriously afflicted than others. The suffering is unparalleled and its acuteness is not mitigated by the distance intervening between our country and theirs. We may have our sympathies and we may have our dislikes for one side or the other, but suffering from any source speaks in the same tone and should appeal to the higher qualities of our inherent manhood.

Americans have ever been responsive to the effects of disasters

which have fallen heavily upon other nations and veterinarians are no exception to the general type. Although each nation, or its allies, in the present conflict, probably has some method or relief fund for alleviating those in acute distress, the suffering is so extensive and resources are so impoverished by the abnormal conditions that the aid rendered is of necessity limited. The veterinary profession is cosmopolitan. Brother practitioners who have lost their all, through no fault of their own, are worthy of generous consideration.

If there is any one organization whose keynote is humanity it is the Red Cross Society. If there is any organization which has the confidence of the people, it is this society. Its neutrality is unquestioned, for it is the suffering that appeals to it. Its worth has been tested and the distress it has alleviated, whatever the source, has brought many blessings upon it. America has been called the melting pot of the nations. In the veterinary profession there are doubtless many who take different sides as to the merits of the present conflict. There are doubtless many who would contribute to one fund but not to another. Let each contribute to the one which has his sympathy, and feel assured that the American Red Cross Society of Washington, D. C. will do its best to bestow the gift where the sender desires it to go. A contribution of this character is twice blest. It blesseth him that gives as well as him that receives.

P. A. F.

ASSAULTS ON LEGISLATION

There are doubtless many states where perennial attempts are made to change the veterinary law in the interests of those who have not conformed to it. The older the law and the stronger and more energetic the profession, the more difficult is it for illegal men to practice. Accessory laws such as the anti-narcotic, annual registration, etc., bring illegal practice more prominently into the light and doubtless also serve in some cases to stimulate some of the illegal men, who may have more or less political influence, to assault the law with the hope of being legislated into an honorable standing.

It is obviously unjust to require a high price of the present generation desiring to enter the portals of the veterinary profession and then legislate an easy side entrance for illegal men, who do not wish to pay the price, to compete with them. A customer has no right

to demand from his merchant that he be charged less than the cost required of other customers. There is a remedy for all illegal men, without invoking the most sinister type of class legislation, and that is to pay the legitimate price. They need not remain in the outer darkness. We have known illegal men who have had spirit enough to remove the taint; who have made up their educational deficiencies; who have spent additional time in a veterinary college and who have suffered some inconvenience in so doing. They have redeemed their own self respect and acquired that of their community and of the members of their profession. When the price is paid they are entitled to respect.

We cannot sympathize with those who desire to short step legitimate requirements nor can we sympathize with assaults upon established legislation which would substitute therefor class legislation of a most pernicious character. The "margin of safety" must not be diminished.

P. A. F.

POULTRY PRACTICE

In years gone by the medical profession ignored the psychological side of medicine and Christian Science arose to trouble it; massage was neglected and osteopathy arose to add to the trouble. Veterinarians have been inclined to ignore poultry practice and this in due time may arise to trouble them. We have heard of choice specimens of poultry that have sold for the price of a good horse or cow. Such specimens are just as liable to disease as the ordinary types. The owner of a hundred dollar cockerel is just as anxious for the amount of money invested in this form as he would be if it were invested in a horse. If the animal dies as a result of disease the loss is the same in either case. If the veterinarian can avert this loss the honor is just as great in the one instance as the other. Although high priced poultry of the type referred to may be exceptional such cases do occasionally occur. Poultry bringing the price of an average sheep or pig are more common and the owner of such specimens is just as anxious over their health as is the stockman over his animals.

Whether it be flocks of poultry, sheep or swine, epizootics are likely to strike them and cause severe losses. All are valuable as food products and should be safeguarded as much as possible. The

poultry industry is worth millions to this country. It is subject to ravages of contagious epithelioma, fowl typhoid, white diarrhea, internal parasites and various other troubles which may spell financial disaster in some sections. Veterinarians are the logical persons to consider and remedy these troubles. If they are derelict in their duty then we may expect the matter will be taken care of by others. Christian Science and osteopathy may not trouble the veterinarian—but poultry should be watched.

Not many years ago small animal practice, as a specialty, was a rarity; now it is common and profitable. Time is demonstrating that the veterinary is a comprehensive profession and that more opportunities for specialization exist than in the past. The veterinarian is the one to develop these opportunities and as they develop the profession becomes more attractive and more important in the minds of the general public.

P. A. F.

EUROPEAN CHRONICLES

Bois Jerome.

EQUINE STRONGYLIDOSIS. This is the name proposed for a parasitic disease of horses, which prevails in some parts of France and that Mr. Leneveu, a practitioner of Normandy, has had the opportunity to observe and study. He records his experience in the *Revue Generale* of Panisset.

The definition given by the author is that it is an apyretic disease, endemic in its form, generally beginning with symptoms of enteritis and giving rise to a progressive anemia. It is due to the presence, in the organism, of nematodes, of the family of the *Strongylidae* and to the genera of *Sclerotoma* and *Cylicostoma*.

Appearing towards the end of the year, rarely while the animals are at pasture but more generally when in stables, the disease presents symptoms that the author has divided into primitive and secondary.

The first consists of three principal manifestations: 1° Diarrhea, not severe at the beginning, the feces having a bad, and sometimes very disagreeable, odor. Worms, larvae and eggs of parasites are mixed with the discharge. Later this diarrhea becomes very severe. 2° Loss of appetite—progressive in its development, until it finally stops entirely. The animal refusing all kind of food

solid or liquid. 3° Loss of flesh. This takes place rapidly and is manifested in a peculiar way. The animal does not look as thin and meager as he is really, because the connective tissue is, in the majority of cases, the seat of an edematous infiltration, which fills up the spaces left empty by the fat.

As the loss of flesh progresses, the general condition changes, the muscles of the shoulder, back and rumps, become atrophied; the coat is dry and staring, the hairs of the mane are easily pulled out, the strength is lost and sometimes the animal has to be kept standing with slings to avoid skin sores from long lying down.

The secondary phenomena are: 1° edema, which is apparent in some cases, or again absent. In some instances it becomes very large and not infrequently gives to the animal the aspect of one suffering with purpura. These swellings are noticed on the extremities or about the head. They may also be seen on the upper parts of the body, gradually passing downwards. These are due to the weak condition of the circulation or again to thrombo-embolic complications.

With all these symptoms, there are also others of various nature, which may be due to toxi-infections or resulting from thrombo-colic embolisms or again from traumatic causes, such as cutaneous sores, internal hemorrhages by rupture of aneurisms, peritonitis by intestinal perforations through verminous abscesses or cysts.

Relative to the etiology and pathology of the disease, the author writes: Strongylidosis is due to the presence in the organism of equines of strongylidae belonging to the genera strongylus and cylicostomes. The species of parasites that are found at post mortems are: The *Strongylus vulgaris* of the great mesenteric artery, the *S. equinus* found in the cecum and principally the parenchymatous organs, the *S. identatus* also in the cecum. As for the Cylocostomes they live in the large intestines and are found there.

After considering briefly the pathologic action of the parasites, both in the larvae and the adult stages, Leneveu gives a review of the evolution and termination of the disease, its recovery, the chronic state, or death and then examines the lesions, of which he only presents the macroscopic exclusively, viz: 1° the intestinal, where are congestion, inflammation or verminous lesions, distributed more or less in every part of the small intestines, 2° the arterial, 3° the glandular and under 4th various kinds, such as

the anemic lesions, the metastatic, or the abscesses, the arthritic and infectious synovitis. Or again the mechanical lesions such as the intestinal and aneurismal ruptures.

The diagnosis of Strongylidosis of equines is always easy to establish, resting as it does on the following points: the time of the evolution of the disease, its endemic character and the careful notice of symptoms.

With Leneveu recovery is the rule if energetic and rational treatment is strictly applied. Of course, complications may occur and a guarded prognosis is advisable.

The treatment has for its basis, the three following conditions: 1—Place the subject in the best condition to repair the organic disorders due to the evolution of the parasites (hygienic measures), tonic medication, artificial serum, etc. etc.) 2—Destroy and eliminate the parasites as much and as quickly as possible (sulfuret of carbone, purgatives, sulfate of magnesia). 3—Treat the complications (caffeine, tonic serum camphorated oil injections, opiates, charcoal, bismuth, salol, etc.)

It is also essential to avoid reinfection by careful selection of the pastures, where animals can be properly watched and receive the care that their condition may require.

DIFFICULT DIAGNOSIS. The Veterinary News has recently published cases, where a diagnosis was very difficult and asks the profession to express an opinion on the nature of the cases, promising at a subsequent date to give an answer as revealed by post mortem.

The subjects and the questions were offered by one of the editors of the News, a practitioner of high repute and well known to the veterinary world. Mr. E. Wallis Hoare F. R. C. V. S.

It is certain that there is not a practitioner of medicine, human as well as veterinary, who during some time of his professional life has not found himself confronted with a case where, notwithstanding a most minute examination of the patient, a careful consideration of the manifestations and a thoughtful analysis of the symptoms, was obliged to acknowledge his inability to advance a diagnosis.

With our patients such conditions can to a certain extent be explained. The history given to us by those around the sick animal may be erroneous or imperfect. Our patients cannot talk and guide us as the human physician is. Although for one who has observed and listened, so to speak, to the language expressed by the

symptoms, this difficulty of our dumb animals has not as much importance as some think. To observe, to have read before of the symptoms, either in books or from the writings of others, to remember and to apply the knowledge thus obtained, the difficulties of diagnosis may be considerably reduced. The example given by the worthy editor of the News deserves much credit and is worthy to be followed by others.

The two cases of Mr. Hoare are here presented :

CASE No. 1. "Aged stallion, in moderate condition, within a period of 18 months has had four attacks of impaction of the colon. In this present attack which commenced on a Wednesday, he had all the symptoms of dull abdominal pains. The case was under the care of another practitioner until the following Sunday when Mr. Hoare saw the animal. The following symptoms were then manifested: Persistent pawing, sweating in patches, looking towards the right flank, pulse quick and weak, respiration accelerated, temperature 101° F., haggard expression, visible mucosae injected, no tympany. According to the owner, had passed small amounts of feces at irregular intervals. Rectal examination proved negative, beyond, revealing an excoriated condition of the rectal mucosa due to the rough administration of enemas by the owner. The animal showed a dull sleepy appearance with eyes half closed. On administration of an enema, marked straining was manifested and muscular tremors occurred.

"From the general appearance of the animal and condition of the pulse it was apparent that a fatal termination would shortly ensue. It occurred in the evening. No diagnosis was ventured."

CASE No. 2. "Harness mare, six years old in poor condition. Previous history: For six or eight weeks she had gradually lost condition and within four weeks, she had a capricious appetite, finally refusing all food for a day or so and then feeding in a listless manner. The owner tried various remedies without result. One morning she had been driven a distance of 14 miles, but within six miles of her destination she became weak and had to be led quietly home.

"Clinical history. The mare showed material emaciation and was hide bound. The pulse was quick and weak, the respiration accelerated, the temperature 101.5° F. Examination of the heart revealed weakness of the cardiac impulse but no abnormal

"sounds. Nothing was elicited by examination of the chest. For
"a few days the only symptoms observed were: slowness in feeding,
"accelerated respirations, anxious expression. The visible mucosae
"were anemic, and the temperature varied between 101° and 102°
"F. On the fourth day it ran up to 104° and free purging was ob-
"served also loss of appetite."

"The temperature ranged between 103° and 102° F. for the
"remainder of the time that she was under treatment. The purg-
"ing abated after a few days and the patient fed at irregular inter-
"vals. Then purging started again, the mare manifested abdom-
"inal pain, lying down for long intervals, looking at her flanks and
"groaning occasionally. A few whiffs of chloroform put an end to
"her misery. No diagnosis was ventured."

It was in the issue of January of 1916 that these two cases ap-
peared and one week later the answers, as obtained from the post
mortems of the two animals, were given.

"In the first case the stomach and intestines were found normal.
"The liver was one-fifth its normal size. It was attached to the
"diaphragm by adhesions. The hepatic tissue was friable, resem-
"bled a sponge, and the entire organ did not show a trace of normal
"tissue.

"In case No. 2, the carcass was found devoid of adipose tissue.
"A large abscess was found in the gastro-splenic omentum and
"must have exerted considerable pressure on the gastric wall. The
"abscess contained a large amount of inspissated pus. The spleen
"was greatly increased in size. It weighed 24 lbs. A large num-
"ber of abscesses were found in the base of the organ and the tissue
"of that region was infiltrated with growths of a whitish appear-
"ance, which unfortunately were not examined microscopically."

As Mr. Hoare suggests, it is to be hoped that the records of
these, will induce others to present similar questions. They will
increase our professional knowledge and help us, if not to relieve
our patients, at least to inform their owners and advise them to
their best advantage for the disposal of their animal, which in many
instances may be of great value.

PYOCULTURE AGAIN. Can this application have the value
granted to it by Prof. Delbet, in the prognosis and indication for
the treatment of wounds of a certain nature?

This value has already been mentioned to the readers of the
Journal, where its claims have been presented in comparison with

the opsonic index. If the properties offered by Prof. Delbet were realized, it is certain that great progress would have been made in surgery.

Notwithstanding the support it has received by experiments and successful opportunities of a few when pyoculture was resorted to it has met with strong opposition from several high authorities in surgery and general pathology, who have pronounced themselves entirely against the great claims made in its favor.

The *Presse Medicale* has recently published an article against it from Doctor Pozzy, a physician of high standing, who by the way is well known in the United States, where he asks: "Can pyoculture be made a practical and quick method to judge of the prognosis by the suppuration?" or in other words "Is it allowed to hope that, with precision, two antagonistic forces be measured, viz. such as the aggressive virulency of the microbes and the defensive power of the organism, by the comparison of what takes place in vitro after being kept 24 hours in the hot air chamber, in a culture of bouillon in a tube or in a pipette filled with pus from a wound?" as Prof. Delbet claims.

Dr. Pozzy gives in review the history of the use of pus as a medium for culture, which is short and then gives the technic which he has followed in his observations and experiments. He continues by the classification of his observed facts, suppurations from wounds or from light injuries. He relates the frequency of the results in both classes and of the presence of positive pyoculture and comes to the conclusions drawn in relation to the prognosis.

"The 28 cases of cultures of pus, which are published here placed in face of the clinical observations, show that pus, taken from the organism, is generally speaking a medium for favorable culture for the development of the microbes that it contains, even when the organism defends itself and that the prognosis is essentially mild."

"Indeed, considering the first class of cases, it is noticed that they were all in severe injuries, for which the necessity of serious interference or a fatal termination was to be feared. And, with all, pyoculture having given a positive result, in peculiarly dangerous germs, (streptococci, anaerobics, various associations,) consequently a severe prognosis would have been justified and would have imposed the most mutilating interference."

"This pessimistic prognosis was not realized. All the degree

"in the importance of the treatment were realized, notwithstanding the similarly positive pyocultures, often identical in quantity and quality. The clinical indications alone have been the guide for this or for that interference or again for entirely abstaining from it.

"In the second class of cases, with various suppurations, it is evident that no matter how convinced of the value of pyoculture, one might have been, no other treatment but the expectant was to be thought of, for such cases as abscesses of the breast, or of the rump, or of the forehead or arm-pit, already open, when the pyoculture was made. But with them a marked positive pyoculture ought in all to have clouded the prognosis, either in some by revealing the presence of microbes particularly virulent or because the organism did not defend itself. Most of these cases did not give rise to any anxiety and all recovered without special therapeutics."

To summarize, says Doct. Pozzy: "The incontestable fact is that pyoculture in pipette may aid in putting in evidence and select in some cases the microbes of a wound, therefore assisting the clinical examination, in a measure, where the bacteriological diagnosis may be useful to fix the prognosis. But to appreciate by it the result of the fight between the organism and the microbes, the answers generally obtained are more likely to misguide the surgeon than to help him."

At any rate, the results obtained by other inquirers such as Prof. Policard of Lyon, Doctor A. Carrel of New York, of Sir Almroth E. Wright and others seem to endorse the objections presented by the writer of the *Presse Medicale*.

In a more recent discussion before the Society of Surgery, Prof. Delbet merely answers the argument above described by saying, that the 2000 satisfactory proofs that he will publish later will answer the 28 different results obtained by his opponent.

BIBLIOGRAPHIC ITEMS—These are very limited, as I have received only a few lately.

However, from the Bureau of Animal Industry, I have to be thankful, for amendment to Regulations Governing the Meat Inspection of the United States and also, Bulletin No. 340 on Experiments in Vaccination Against Anthrax by Doct. Adolph Eichhorn, Chief of the Pathological Division.

After a concise examination in the prevalence of anthrax and the methods of control, where due credit is given to Pasteur, who first discovered and applied a method of vaccination, and after proper and justifiable criticisms are made and also to other methods discovered by others, the author treats of the production of serum, of its standardization, of the preparation of spore vaccine, of the technic of administration, of the test made in cattle, sheep and use of the serum in the treatment of man, and comes to the following conclusions:

1—Horses are suitable for the production of highly potent anthrax serum. Serum of such horses should protect large animals in 10 c.c. doses.

2—The use of the serum-alone treatment is indicated in cases where the infection has already occurred in a herd. Since the serum confers only a passive immunity, it is advisable to revaccinate the herd in from three to five weeks by the simultaneous method.

3—The serum possesses great curative properties. Depending on the severity of the infection, the curative dose is from 30 to 100 c.c., the injection to be repeated if necessary.

4—For the simultaneous treatment a spore vaccine, carefully standardized, is preferable to the ordinary Pasteur vaccine.

5—Spore vaccine should be employed also in preference to the Pasteur vaccines for immunization with vaccine alone. This vaccine has a decided advantage over the Pasteur, because of the possibility of more accurate dosing and because of its better qualities.

6—Experiments with concentrated serum and dry spore vaccine are very promising. This method would greatly simplify the vaccination process and also insure the product against subsequent contamination and deterioration.

I have had also from Doctor Dalrymple a circular from the Louisiana State Live Stock Sanitary Board, giving a brief history of the Cattle Tick fight to date in that state, and which brings the reader to the great results obtained in the efforts made to be delivered of the pest which has been so injurious to the cattle of Louisiana.

A. LIAUTARD.

SHIPPING FEVER OF HORSES*

JOHN R. MOHLER, Washington, D. C.

INTRODUCTION. There is probably no disease of horses the etiology and differentiation of which are in such a chaotic condition as that pertaining to the various infections covered by the general term "shipping fever." There is already a very extensive literature on this group of diseases, and the determination of their causation has been the object of many researches, but with very conflicting results.

The term "shipping fever" is generally applied to any one of a group of epizootic infections of horses characterized by the presence of fever and presenting evidences of lesions in one or more tissues, with a marked tendency to spread to other susceptible equines. As this group of diseases usually occurs after the shipment of young western horses eastward or the transfer of "green" country horses to city stables, the term "shipping fever" has been adopted by many to cover any or all of the infections of this character.

All the large sales stables in our great cities are no doubt infected with these contagions, and the shipment of susceptible horses through these stables causes their subsequent owners untold losses every year. From an economic standpoint, these shipping fevers bear the same relative importance to the equine as tuberculosis and contagious abortion do to the bovine species.

Most authors recognize three distinct etiologic entities under the term "shipping fever," namely, strangles, influenza and contagious pneumonia. As early as 1862, Falke stated that two distinct infections should be recognized, one influenza, and the other typhus, now referred to as contagious pneumonia, and in the present day most writers separate these infectious diseases from each other as well as from equine distemper or strangles. Thus Hutyra and Marek in their third German edition, which has been translated into English, refer to a catarrhal and pectoral form of influenza as two different manifestations of the same infection, but in their recent fourth German edition they describe each as a distinct entity, referring to the former as influenza and to the latter as contagious pneumonia. However, it is well known that cases showing

*Presented at the meeting of the A. V. M. A., Section on Practice, Oakland, Cal., September, 1915.

uncomplicated influenza as well as those presenting evidences of strangles or contagious pneumonia may be met with in the same stable. In many instances the practitioner may even with the possession of considerable diagnostic skill and experience be unable to state definitely as to which of the above diseases the outbreak should properly be attributed. In fact, so many difficulties arise in connection with the differential diagnosis of these affections that many veterinarians for clinical purposes refer to them all under the heading of shipping fever. From a practical point of view, the question of differential diagnosis is not of so much importance as the necessity for attention to the preventive measures which should be adopted in all these infections.

While the evidence is not absolute as to the causal factor in any one of these diseases, the experiments of the Bureau give support to those investigators who believe that the *Streptococcus equi* of Shütz is the cause of strangles, the filterable virus of Poels the agent of influenza, and the cellular inclusions of Gaffky and Lüher the causal factors of contagious pneumonia. However, the question of the true etiology of these diseases requires much further investigation, and must be considered at the present time as unsolved.

EPIZOOTIC LARYNGO-TRACHEITIS. (INFLUENZA). For the purpose of opening this symposium, I shall refer more in detail to a catarrhal form of shipping fever which was so wide-spread in the United States about two years ago. Early in 1913 there appeared in the sales stables at the National Stock Yards, Illinois, what was reported to be an unusual contagion particularly among mules, although affecting horses as well. The disease spread rapidly to various sections of the country where infected animals were transported, with the result that reports of its occurrence reached the Bureau from various points extending from Texas to Delaware but more especially in Tennessee, North Carolina and Kentucky. The result of such wide-spread dissemination was to make this affection bear the same relative position of economic importance among equine diseases in 1913 as forage poisoning or spinal meningitis had occupied in 1912.

In the first of these cases observed, there was considerable swelling of the throat and intermaxillary space, with difficult breathing but no abscess formation even in those cases where the throat had been severely blistered. In the earlier stages there was a slight bilateral discharge from the nostrils which at first was watery

and later became mucoid or muco-purulent. During the onset of the disease the temperature ranged from 106° downward. Frequently the animals developed a short spasmodic cough which caused spasms of the larynx and suffocation relieved only by the tracheotomy tube. A marked tenderness of the larynx and trachea could be readily demonstrated. In other cases the first symptoms observed would be a depressed condition of the animal with a slight cough and a gradual enlarging edema of the throat and neck, sometimes extending down to the thorax, but more frequently involving the head which sometimes became swollen to a considerable size. These swellings did not appear to end abruptly as in purpura, nor did purpura intervene in any of the cases which came under my observation. In those animals showing extensive swelling of the head and throat the tongue protruded from the mouth and became paralyzed making it impossible to swallow either food or water. These conditions gradually became aggravated for from 3 to 5 days during which time pneumonia intervened with necrosis of the lungs noticeable by the offensive fetid breath. In some cases there was a pulmonary edema accompanied by the necrosis of the lung, and the picture then resembled that of contagious pneumonia.

On post-mortem the head was found to be very much swollen from the subcutaneous edema, the tongue protruded some inches, extensive necrotic tissue was noted on the base of the tongue, the soft palate and involving the pharynx and occasionally both guttural pouches. A sero-fibrinous exudate appeared in the intermaxillary space, on the head and in the anterior pectoral region. In one case produced experimentally by inoculating scrapings from the mucosa of the guttural pouch of another animal the horse died on the 9th day and on autopsy showed marked edema of the pharyngeal region with narcotic pneumonia. Where the swellings were present before death, the tissues were found to be filled with straw colored edematous fluid. Occasionally petechial spots were noted in the mucous membrane of the nasal septum. There was no pus found except in one or two cases complicated with strangles. If the animals did not succumb as a result of suffocation from the edema of the larynx, the lungs would show the usual picture of pneumonia with more or less pleuritic involvement.

The period of incubation of the disease appeared to be from 3 to 7 days. The outbreak was of a very virulent type and in many cases was complicated as has been stated, by the simultaneous pres-

ence of strangles and contagious pneumonia in the same stables. The cases assumed various forms in different parts of the country. In Delaware for instance, there were two outbreaks studied where the horses did not show marked laryngeal affection but the disease was just as fatal and the same organisms were isolated as from the heads of the Tennessee and North Carolina cases. As a result of the pathological and bacteriological study the diagnosis of epizootic laryngo-tracheitis was made because the symptoms bear a closer analogy to that affection as described in Volume II of Hutyra and Marek than any other described disease, but with the exception that this epizootic was of a much more virulent form, and from its widespread prevalence, contagiousness and symptomatology. it may be well described as a malignant type of influenza. It bears the same relationship to influenza as any other form of the disease such as pink eye, infectious pharyngitis, infectious bronchitis, etc., all of these affections being only varieties of one and the same etiologic entity. In other words equine influenza manifests itself in as many varieties of forms as does its human analogue, la grippe.

ETIOLOGY. Positive results from artificial infection experiments indicate that influenza is caused by a filterable virus which occurs in the blood and possibly also in other body fluids of affected horses, and which remains for a certain period of time in the animal after recovery.

After Dieckerhoff had succeeded many years ago in transmitting the disease by subcutaneous and intravenous inoculation of warm blood from affected horses, Poels accomplished the same results with fresh as well as with filtered semen of a stallion which had been infecting mares for months by the act of coitus. With the blood of artificially infected horses he further transmitted the disease even after the blood had been filtered through a Berkefeld filter. Later Lühns succeeded in transmitting the disease by subcutaneous inoculation of fresh or defibrinated blood, while Basset accomplished this also with filtered blood as well as with blood serum which had been kept for 4 months in an ice box. Similar results were obtained by Gaffky in his transmission experiments in which he observed the development of the disease from subcutaneous injections of 5 c.c. of both defibrinated and filtered blood in 5 to 6 days, and from intravenous injections in 4 days. On the other hand, the infectiousness of the blood was destroyed by the addition of citrate of ammonia.

From the blood and blood serum which had proved virulent for inoculations it was impossible to obtain cultures of any microorganisms.

The virus appears to be retained in the body of a horse for a long time in a virulent condition and stallions have transmitted the disease by coition months after they have recovered from the disease. In 1907, the Netherlands Government bought a stallion in France which was passed as sound. When put to stud, he infected every mare, the disease appearing 3 or 4 days later. Our experiments have demonstrated clearly that the filtered blood of influenza cases is capable of reproducing the disease in susceptible horses, while the inoculations of various bacteria recovered from such cases have thus far proved negative.

In several heads from animals dead of this malignant form of influenza complicated with contagious pneumonia received from Tennessee, there was an intense inflammatory edema, around the region of the larynx and pharynx, and in this edematous fluid were a limited number of hyaline lymphocytes enclosing protozoan-like bodies rod-shaped, pyriform or round in outline. In some of the cells of the greatly swollen pharyngeal lymph glands the same bodies were noted. These were probably the protozoan-like bodies found by Gaffky in cases of contagious pleuro-pneumonia considered by many as the causative agents of this type of pneumonia. This belief has been further strengthened by the splendid results which are being published in all the current German veterinary periodicals from the use of 606 (salvarsan and neo-salvarsan) since salvarsan is known to have great, in fact, specific therapeutic value in many of the protozoan diseases. When Ehrlich's attention was called to the almost specific action of 606 in contagious pneumonia, he expressed his belief that it was due to the fact that the disease in all probability was caused by a protozoan. For a concise review of the salvarsan and neo-salvarsan treatment of contagious pneumonia, you are referred to an article by Schwartzkopf in the *American Veterinary Review* of February, 1914, page 634.

TREATMENT. The fatalities from epizootic tracheitis two years ago were very high, although the usual methods of treatment were adopted. These consisted of hot and cold applications, antiphlogistine and mustard poultices, blisters and liniments externally, and bacterins, antitoxins, phylacogens, adrenalin chloride, nuclein solution, strychnine, potassium chlorate, tincture of ferric chloride,

heart stimulants, febrifuges and astringent mouth washes internally.

The vaccine treatment for influenza is being given great publicity in this country at the present time and is more extensively used for this affection than for any other disease in horses.

Various manufacturers of biological products prepare bacterial vaccines for immunizing and curative treatment of influenza. The organisms which enter into the preparation of the vaccines vary not only as to the species but also in the number contained per c.c. All bacterial vaccines prepared for the treatment of influenza contain streptococci isolated from cases of influenza in horses in very large proportion as compared with the number of other organisms used in these preparations. Of the other organisms the staphylococcus, pneumococcus and bacillus coli communis are used. Besides, one manufacturer adds to the preparation an unidentified rod-shaped bacillus isolated from cases of influenza, and another a bacillus which has been claimed by Dr. Lintz of the Long Island College Hospital as the etiological factor of the disease. Its relation, however, to the disease, has never been satisfactorily demonstrated, and therefore its presence in the preparation is of an unknown value. As we received a number of letters from veterinarians regarding a certain vaccine prepared at that time solely from this so-called *Bacillus Lintz*, I will elaborate more fully on this phase of the subject.

In the first place Lintz, in his article, (Footnote: *Journal of Experimental Medicine*, Vol. XVII, No. 5, 1913, page 511), confuses distemper in horses with influenza. Distemper of horses should be used synonymously only with strangles in horses. The evidence brought forward by Lintz to incriminate the *Bacillus of Lintz* as the causative agent of influenza in horses is very inconclusive. This evidence is based upon three propositions:

1. The isolation of the organism from a horse that succumbed to influenza;
2. The agglutinating power of serum of affected horses for this organism; and
3. The value of the vaccine as a therapeutic and prophylactic agent.

The experimental evidence set forth under the first proposition is based on a single incomplete experiment. The author isolated from the lungs, heart, blood, spleen and kidney of a horse that succumbed to the disease the *Bacillus of Lintz*, together with a pneu-

mococcus. He found that colonies of *Bacillus* of Lintz were more numerous than those of the pneumococcus. This is not strange, since the *Bacillus* of Lintz is a very profuse grower, while the pneumococcus is just the reverse. One horse was injected intravenously with an agar culture, and 24 hours after the inoculation the temperature rose abruptly to 105 degrees F., the horse refusing nourishment, and exhibiting marked signs of weakness and constipation. The temperature fluctuated between 103 and 106 degrees for three days, gradually returning to normal at the end of five days. No attempt was made to recover the organism. The disturbance exhibited in this experimental horse was probably a result of protein poisoning. This contention is evidenced by Lintz's own experience with the vaccine upon normal horses when he states, "They reacted in various ways, some being slightly, if at all affected. One reacted violently, the temperature rising to 105 degrees F. ten hours after the injection, and presented all the symptoms of the accustomed disease, subsiding gradually to normal at the end of four or five days."

On two different occasions we failed to produce the disease by injecting susceptible horses intravenously with a culture of the *Bacillus* of Lintz grown on four agar tubes. About thirty minutes after the injection of the first horse, the respirations and pulse became greatly accelerated and the temperature raised from 101° to 102.2° F. Two hours after injection the temperature had reached 103.6° F. That night the animal refused its feed. The next morning the fever had subsided and the other symptoms had also abated.

The second horse was injected two months later with a fresh culture just received from Dr. Lintz's laboratory. One and three-quarter hours later the temperature had risen from 100.1° to 103.4° F. with slightly increased respirations and pulse, which quickly subsided and on the following day the animal showed no symptoms which could be attributed to the material injected.

It seems evident that the sudden onset of symptoms without any definite period of incubation was the result of a protein poisoning rather than from the multiplication and activities of the injected organism. A bacteriological study of this *Bacillus* of Lintz shows it to belong to the colon-typhoid group of bacteria, as it was found to be a motile, non-Gram staining, non-liquefying bacillus, fermenting dextrose and lactose, but not saccharose, and acidifying, but not coagulating milk.

Furthermore, this classification of the bacillus is corroborated by the previously mentioned results obtained by Lintz in horses injected with the dead bacilli in the form of a bacterin, as it is well known that the toxin of this class of bacteria is endo-cellular in nature and the injection of dead bacilli produces symptoms almost equal in severity to those induced by injection of the live organisms.

The preponderance of evidence appears to be in favor of an ultravisible microorganism as the cause of influenza, the lowered vitality occasioned by this virus paving the way to infection with the colon bacillus, cocco-bacillus, *B. necrophorus*, *B. pyocyaneus* staphylococcus, pneumococcus and most important of all the various species of streptococcus. The frequency of these streptococci as secondary invaders in animals dead of influenza has caused the various biological houses to use as many strains of these organisms as possible in the preparation of their polyvalent influenza bacterins.

Antistreptococcic serum is also being used to a considerable extent in the treatment and prevention of influenza, although it does not enjoy the popularity of the bacterial vaccines. This no doubt is primarily due to its greater cost and also to the greater inconvenience which the treatment with serum involves. In foreign countries the serum treatment is given preference to vaccine therapy. It is natural that for curative purposes better results may be expected from the serum treatment than from the bacterial vaccines, since through the introduction of the antistreptococcic serum large amounts of immune bodies are injected into the animal, which immediately act favorably upon the disease. It is required, however, that a considerable quantity of such serum should be injected as antistreptococcic serum does not appear to be effective when employed in small quantities. The immune bodies which are injected with the serum exert their action upon the disease and after being used up, or after their elimination from the body, there remains nothing to continue to stimulate the production of additional protective substances in the animal. Therefore in the serum treatment it is often necessary to repeat the injections until favorable results are apparent. On the other hand, with the bacterial vaccines the results are not immediate, since the dead organisms injected into the animals require a certain period of time to stimulate the body cells in producing protective substances, and they remain in the body fluids for a longer period of time, acting continuously.

The results obtained from the treatment of influenza with

certain biological products appear to be in general satisfactory. The actual value, however, can not be definitely established as the available data can not be considered as absolute evidence of the potency of this method of treatment. It may be that a veterinarian in practice will immunize a certain number of horses against influenza and if the disease fails to develop he naturally attributes it to the treatment, while as a matter of fact it may have been the result of absence of sufficient exposure or to a resistance of the animals against existing exposure.

The virulence of the disease must also be given consideration in this respect since quite frequently the infection appears to have a very low virulence and the animals affected show only a mild type of the disease, whereas at other times it appears in a very severe form when pectoral complications are especially prevalent, and in consequence the mortality is greater.

Since the etiology of equine influenza is not satisfactorily established and since it appears that the causative factor of the disease is an ultra-visible microorganism, the treatment with biological preparations as employed at the present time does not seem to have a close relationship to the original cause of the disease. Nevertheless we should not overlook the fact that the favorable results which are reported from the use of bacterial vaccines must have some connection with the pathogenicity of the disease. The action of the bacterial vaccines as used at the present time is chiefly to assist in preventing or controlling the secondary infections which are invariably associated with influenza, and this opinion is substantiated by the fact that the influenza vaccines when injected in the early stages of the disease frequently result in a mild type of an attack with shorter duration.

It will require closer observation and more accurate data to establish definitely the value of bacterial vaccines for the treatment of influenza, but even at the present time their use appears justified, especially for the purpose of allaying the possibility of severe complications.

The manufacturer of biological products for interstate commerce has been under the control of the Department of Agriculture since July 1, 1913, and even in this short time a great deal of important work has been accomplished, not alone as to the method of their preparation, but also in eliminating such products in the preparation of which bacteria have been used which have no relation to the disease.

As the use of some of these biological products in the treatment of domestic animals can not be considered as established on a solid foundation, the real therapeutic value of many of these preparations can be determined only by testing the different products on a very large scale. The cooperation of practicing veterinarians is very essential in this regard, since only by careful observations and compilations of the results can the worth of any method of treatment be estimated.

The prevention of influenza must naturally play an important part in the control of the disease. Infected animals should be separated immediately from healthy horses. The principal source of the spread of influenza is without doubt in the sale stables and feeding barns, and accordingly periodical disinfections of these places would greatly diminish the danger from these sources. Further, disinfection of cars in which horses from such infected stables and barns have been shipped would be an important factor in the prevention of the spread of the disease. In the not distant future Congress will no doubt see fit to authorize the Bureau of Animal Industry to supervise the shipping of horses infected or exposed to influenza and the disinfection of contaminated cars, in the same manner as is being done today with cattle mange, hog cholera, sheep scab and Texas fever. A beginning has already been made in cooperation with the State of Kentucky, which by proclamation quarantined against all horse stock coming from St. Louis and the National Stock Yards, unless the animals had been inspected and the shipments made in disinfected cars approved by the Bureau. This cooperation has resulted in a marked reduction of shipping diseases, according to the statement of State Veterinarian Graham, and if other states would likewise quarantine against those horse centres whence their greatest amount of infection originates, I am sure the Bureau will cooperate to the fullest extent of its power.

BACTERIOLOGY OF CATARRHAL FEVER, STOCK YARDS FEVER OR SHIPPING FEVER*

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The existence of an infectious transmissible disease of solipeds which passes through public stock yards, sales barns and those transported by rail or transport, is common knowledge to horse dealers, shippers and veterinarians. The exact identity of this disease has not been determined. It is an acute infectious disease characterized by catarrhal inflammation of the anterior respiratory tract, with or without suppuration of related lymph glands and is frequently associated with pneumonia or pleuro-pneumonia. For convenience the uncomplicated form is usually designated as the catarrhal form and the complicated type as the pectoral form.

Catarrhal fever is very prevalent throughout the United States and other countries. As the name implies the disease is more prevalent in horses that are marketed and more particularly those that are shipped, although it sometimes becomes enzootic in agricultural communities. The percentage fatality varies from one to sixteen. The high percentage fatality occurs in the pectoral form, that is, in those cases that are complicated with pneumonia. The percentage of fatality, although rather high, is not as serious as is the depreciation due to loss of condition of the affected animals and the further loss of time and amount of feed necessary to put the animals back into condition; and again the disease frequently leaves the animals defective in some ways, as cardiac disturbances, emphysema, etc. Economically considered this disease probably costs the horse industry more than any other disease.

The disease under consideration is not the old type of disease known as "pink eye" or influenza, although the two diseases may occur simultaneously. The infectiousness of shipping fever has been recognized since about 1850, but the exact specific cause is still a mooted question.

A variety of microorganisms have been identified with catarrhal fever and probably the large number of microbial agents that occur in this disease explains the multiplicity of lesions that characterize the disease. Although results were not published, the author

*Presented at the meeting of the A. V. M. A. Section on Practice, Oakland, Cal., September, 1915.

made some preliminary bacteriologic investigations in 1902-3 and in 1915 in Kansas City, Missouri. The following bacteria were identified:—streptococcus, micrococcus, (staphylococcus) pyogenes aureus, albus and citreus, bacillus pyocyaneus, pneumococcus, micrococcus catarrhalis, bacillus coli communis, and a variety of contaminating non-pathogenic bacteria. The foregoing bacteria were isolated from the nasal and ocular discharges, tracheal smears and jugular blood of the living animal and from lesions of the lungs, bronchial tubes and pleura in the carcasses of animals that were autopsied soon after death.

Streptococci were identified in the nasal discharges in over 80% of the cases showing catarrhal condition of the anterior respiratory tract. The same or a very closely related organism was obtained in the blood from 40% of the cases affected with the catarrhal type of the disease. These streptococci were identical microscopically and culturally to a streptococcus that was isolated from the pus of a submaxillary abscess of a colt affected with strangles. Intraperitoneal injections of the streptococci that had been recently isolated from either the nasal discharges or the blood produced purulent peritonitis and in one instance pyemia and death in a guinea pig. The injections of recent cultures subcutaneously in old horses usually produced abscess formation in from 2 to 5 days.

Of the ordinary pyogenic micrococci (staphylococci), the albus was most prevalent, having been identified in the nasal discharge in 30% of the affected animals. This organism was not isolated from the blood of a single case affected with catarrhal fever, although it was obtained from the bronchial tubes and lung lesions in two of the cases that were autopsied. Experimental inoculations with the *Micrococci pyogenes albus* resulted in the production of abscess in experimental guinea pigs and an intense subcutaneous inflammation with an occasional abscess formation when injected subcutaneously in old horses.

The *Micrococcus (staphylococcus) pyogenes aureus* was identified in a fraction less than 9% of the nasal discharges of affected horses. This organism was isolated at autopsy from the lung in one case only, and it was not obtained from any blood cultures. The experimental inoculations of the aureus proved its pus producing capacity in guinea pigs and less constantly in horses.

The *Micrococcus (staphylococcus) pyogenes citreus* was obtained in the nasal discharges in only two instances. It did not develop

in any of the blood cultures neither was it isolated from any cultures made at autopsies. The two cultures of *Micrococcus (staphylococci) pyogenes citreus* isolated had a very low pathogenic power as evidenced by the inoculation experiments.

A diplococcus which was identified as the pneumococcus was obtained in two instances from blood cultures and from the lung in practically every case autopsied that was affected with pneumonia. This organism showed uncertain and irregular pathogenic power in the inoculation experiments.

The *Bacillus pyocyaneus* was isolated from the nasal discharges in two cases and from a necrotic pulmonary center. Experimental inoculation produced fatal peritonitis in a guinea pig in three days. The cultures of this organism showed the characteristic pyocyanin staining of the culture medium.

The *Bacillus coli communis* was identified in approximately 30% of the nasal discharge cultures, in 10% of the cultures made from lung lesions at autopsy but it was not obtained from the blood in a single instance.

An organism very similar and possibly identical to the *Micrococcus catarrhalis* was isolated from the nasal discharge in one instance. It was probably an accidental contamination possibly obtained from the culture taker.

Several non-pathogenic microorganisms such as the *B. subtilis*, *B. proteus vulgaris*, *B. megatherium*, *Sarcina lutea* and other unidentified varieties were obtained particularly from the nasal discharges, the *B. megatherium* being obtained, probably as a contamination, in one blood culture. A bipolar staining microorganism was obtained in one blood culture but was considered a contamination. The above findings were the results of the study of 42 cases of catarrhal fever. These cases were in various stages of development, as they represented cases as they occur in a routine practice. The nasal cultures were obtained from the nasal mucosa about 4 inches above the opening of the nostril and after cleansing the external surface with dry cotton. The blood cultures were made from the jugular vein after saturating the skin with alcohol or tincture of iodine. The autopsy cultures were obtained from bronchi or lung lesions immediately after incising the part. Agar, serum agar and bouillon were the usual culture media used.

Ferry reported his findings of bacteriologic investigation of catarrhal fever in a paper presented to the American Society of

Bacteriology in December, 1911. From this report and more recent literature Ferry gives the streptococcus preference in the causation of catarrhal fever. Schütz in 1888 described the *Streptococci equi*, Sand and Hensen independently described the same organism claiming it was the cause of strangles.

Lignieres and previously Babes have claimed the exciting cause of catarrhal fever was a bipolar staining microorganism belonging to the hemorrhagic septicemia group and the name *Pasteurella equi* has been suggested.

It has been suggested that a filterable virus is the specific cause of catarrhal fever and in this relation Poel's observation is of interest. He observed a stallion that transmitted the disease by copulation. This transmission continued for months. The semen from this stallion either entire or the filtrate transmitted the disease and the filtered blood of infected animals also proved infectious.

That pyogenic bacteria of the various kinds that have been identified in this disease, are a factor, cannot be disputed. Streptococci are frequently responsible for suppuration of lymph glands as is evidenced in colt distemper or strangles and it has been found that streptococci are usually present in the pus of those cases of catarrhal fever in which suppuration of lymph glands occur. Again it has been demonstrated that the percentage of cases in which there is suppuration of lymph glands can be diminished if not entirely prevented by immunizing susceptible animals with a strepto-bacterin. The intensity of the catarrhal inflammation is also materially diminished by the immunization of horses with large doses of mixed bacterin prior to their exposure to catarrhal fever. Pneumonic complications can be largely avoided by the immunization with a mixture of streptococci and pneumococci bacterin. In fact the complications of this disease, that is, suppuration, pneumonia, and pleuro-pneumonia can be diminished if not entirely prohibited by immunization with a bacterin composed of the usual microorganisms causing the complications and thus diminish the fatalities of this disease. This immunity is not of long duration as exposed immunized animals may become infected in from six weeks to six months. However, it must be concluded that the various identified microorganisms are probably not the only etiologic factors of shipping fever.

THE TREATMENT AND MANAGEMENT OF SHIPPING FEVER IN RURAL DISTRICTS*

J. D. FAIR, Millersburg, O.

The extent of my experience in the treatment and management of shipping fever and other serious febrile diseases, as a result of transportation from the farm through shipping centers and again taken to the farm and the tendency of other horses of the farm to which they are taken, to contracting the same or similar disease, has been very extensive.

I remember one year, one of my patron's business, which was the buying, selling, feeding and shipping of horses, amounted to over one million of dollars; also six other patrons that bought and sold horses by the car load. Those men bought their horses in Iowa, Illinois, Indiana and Ohio, shipped them to Chicago, lashed them through the Chicago auctions and if the prices were not satisfactory they were reloaded and brought to Millersburg, Ohio, and sold on the block, while others were distributed among the farmers, to be developed for the eastern markets. Fifty per cent of those horses contracted shipping fever and other febrile diseases and infected fifty per cent of the horses on the farms to which they were taken.

The etiology, pathology and bacterial findings of shipping fever have been ably discussed by Drs. Mohler and Kinsley, and I will direct my attention to the treatment and management. The best methods of shipping to prevent further infection, and the preparation and treatment after arriving at their destination.

In the first place I advise a change in shipping. Instead of going to the various horse markets to buy the horses, go direct to the farmer and have him deliver the horses to some shipping point. Instead of shipping by freight, the conservative dealer will ship by express, in a car that is clean, well bedded with hay and somewhat disinfected. Those shipments are rapid and when once started usually go to their destination without unloading or even much delay. When horses are shipped by freight, or otherwise, the first few hours they are excited, nervous, they fight and crowd until they perspire freely, and if shipped by freight, they are usually

*Presented at the meeting of the A. V. M. A. Section on Practice, Oakland, Cal., September, 1915.

left on some siding, exposed to drafts, and when started they heat up again, thus preparing the field for the development of "shipping fever, influenza and various complications." If unloaded and left to stand in some sale barn, and lashed through an auction, shipping fever is almost sure to follow, and if those horses are distributed among the farmers the infection is invariably spread to the horses on the farm, wherever they are taken.

During latter years the most of our feeders were advised to prepare special stabling, separate and apart from their main feeding barn, and to provide water in special buckets, until they recover and are acclimated. In this way you can partially prevent the infection to other horses that may be feeding or are otherwise used upon the farm.

If the season is favorable, we keep the horses in the open, turn them to grass, plenty of fresh air, water and light grain rations, and if with precaution, and under this management they develop shipping fever and the many complications, I proceed to give them the following treatment.

I always considered that shipping fever was due to a mixed infection, the germs having a particular desire to search the nervous system, and if their attention and efforts are directed to one particular organ you have a complication to deal with, besides the general debility and prostration.

In my opinion there is no specific or set line of treatment. The patients must be seen and a physical and clinical examination made and such treatment prescribed as the conclusion of the examination would suggest.

First we place the patient in a good box stall, clean and well ventilated, everything in a good sanitary condition, clothe the patient to suit the season of the year, offer choice laxative food also fresh water in a clean pail. The feed and water I consider very important, also the nursing of the patient. The administering of the medicine must be at regular intervals day and night. Good judgment is a great factor in the successful treatment of shipping fever.

When I find a horse with a temperature of 106 to 107, pulse 60 to 72, the respirations rapid, uneasy, shifting of the limbs, general debility, congestion of the upper air passages, just recently shipped, I wrap him in good blankets, administer a diaphoretic, diuretic, febrifuge and stimulant, and locally I apply a good sharp liniment

to the throat, from ear to ear, to the breast and over the lungs. I do this effectively. I want the patient to dance and perspire freely, and as a rule in twenty-four hours time you have aborted the disease or at least lessened the danger of complications. If I find a rapid rise of temperature the second or third day, I again repeat the process of sweating and my theory is this: I distribute the force, determination and tendency towards any particular part or organ and at the same time eliminate a great deal of poison. Generally speaking I usually prescribe as follows:—

Quinine sulphate	½ oz.
Hydrochloric acid	1 dr.
Sol. strychnia sulphate	2 gr.
Fluid ext. digitalis	2 dr.
Fluid ext. jaborandi	6 dr.

Spr. Frumenti, add q.s. to make 8 oz. Sig:—One ounce every three hours with ounce of water. I always give a laxative, viz:

Aloin	30 gr.
Strychnia	⅛ gr.
Calomel	15 gr.

also nitrate and chlorate of potash in the drinking water. I modify this treatment, as I said, before the physical and clinical examination suggests the treatment. After the patient has passed through the acute stage I then give him tonics and stimulants with plenty of fresh air and exercise. I might go on and write on many complications, but time forbids. However, I will call your attention to one: pleuro-pneumonia. If I see a patient in the early stages I always apply a good mustard blister. I use one pound of Coleman's mustard. I make a thorough application and cover well with table oil cloth, fasten well with two surcingles and leave in position for three to four days. I hold that this serves a triple purpose. 1st. As a result of the irritation, I expect diaphoresis to follow and this has a tendency to relieve the congestion. 2nd. If the external irritation is greater than the deeper seated, the lesser will yield to the greater. 3rd. Again it serves as a good hot poultice for three or four days. After this I remove the mustard and try to determine whether I have or am going to get an effusion; if an effusion, aspirate early and repeat if necessary. The medicinal treatment should consist of heart and diffusible stimulants with potass. iodide in the drinking water. Stimulate the appetite, cre-

ate all the power of resistance possible. By this treatment, sometimes varied, I have been able to save a fair per cent of cases.

When you find that peculiar complication of influenza affecting serous membranes and especially the parietal pleura and pericardium, and rarely showing any catarrhal symptoms, a very fatal form, the per cent of mortality runs very high. I never associate this form with shipping fever and consider it a subject by itself and not under the heading of this symposium. If I find a case having a tendency to transudation, dropsical effusion, great swelling of the legs, infiltrated conjunctiva, commonly known as pink eye, it is not considered so fatal, however, the financial loss, if the same be neglected, is great. Special attention should be given to the treatment of the eye. There should be persistent bathing of the eye with hot water at least two or three hours. After bathing I usually place one grain tablet of quinine-urea in the lower canthus of the eye, after this I use the following preparation:—

Adrenalin	gr.	$\frac{1}{4}$
Zinc sulpho-carbolite	gr.	8
Boracic acid	grs.	8
Atropia sulphate	gr.	1
Aquae dist.	oz.	1

Of this solution I drop a portion into the eye every three to six hours. It is necessary to give a laxative, and the surest way is to give,

Aloin	30 grs.
Strychnia	$\frac{1}{8}$ gr.
Calomel	15 grs.

every three hours until you get a free action of the bowels, then this part of the treatment may be discontinued.

I call your attention to this form of the disease for this reason, it is considered by many veterinarians and horse owners as rather a simple trouble. But when you know that a neglected case of conjunctivitis or catarrhal ophthalmia leaves a defective eye or a predisposition to recurrent attacks and finally total blindness, it calls for prompt action.

In my years of practice I have seen many horses go to market with defective eyes and on some farms nearly every horse blind, largely the result of carelessness and for want of proper and prompt treatment. Of course I give those cases of "pink eye" other treatment, such as, febrifuges, stimulants and diaphoretics:

whatever treatment they need. But I wish to impress upon your minds that it is very important to relieve the morbid condition of the eyes as early as possible.

Shipping fever complicated with spinal meningitis or congestion of the spinal cord: this is a serious complication. Those cases are up and down, and when down lie flat. They get up but stand only a short time and go down in a heap. They lie too much and finally develop passive pneumonia, become unable to rise and finally succumb to the disease. The only suggestion I have to offer is to put those cases in slings before they get too weak and have the nurse apply hot packs, counter-irritants, etc., mostly to satisfy the owner. I have no particular line of treatment to recommend, simply treat the conditions as you find them. I might write on other complications or the result of morbid conditions arising from shipping fever, but do not consider them of particular interest.

I was requested to give my opinion of the vaccines and antitoxins for the prevention and treatment of shipping fever. I will give my opinion from my observation and actual experience with the treatment.

Some of my eastern friends said, "We have no sick horses since we vaccinate them". I could not reason that way but concluded to give polyvalent bacterins, antitoxins and vaccines a fair and impartial trial. I provided myself with vaccines made by different drug firms and other vaccine laboratories and followed out the preventive and curative treatment of shipping fever, influenza and pneumonia. With me the treatment proved a failure. Horses that I immunized and were shipped to the eastern market, developed shipping fever, etc., others that I immunized that were not shipped developed shipping fever and complications to as great a per cent as those that were not immunized.

I remember particularly one car load of horses that were bought in Iowa, vaccinated, shipped to Chicago, unloaded and put through the auction. Prices not being satisfactory, they were reloaded and brought to Millersburg. Practically every horse developed shipping fever, influenza, pneumonia and other complications, and the curative treatment was no more satisfactory than the immunization. I do not wish to discourage biological treatment but rather encourage it, and I hope that the products will be standardized so that they are reliable and can be used with confidence and success.

During the past few years I have treated cases of shipping fever,

and distemper. Cases having a discharge of pus from the nostrils and other pus formations, by following out Dr. Charles H. Duncan's theory of autotherapy. In my opinion vaccine or toxin, prepared and used in this way, seems to me more plausible and has proven more effectual than any laboratory vaccine that I have used.

In conclusion, I will say use rapid and direct transportation, avoid exposure to infected barns and districts, distribute them as much as possible, give them plenty of fresh air and keep them moving; this has proved to be the best preventive management, and if they contract disease, prompt medicinal treatment so prepared to meet the indications and counter-indications of each individual case with careful nursing, good surroundings has proven to me to be the best in the *treatment and management of shipping fever in rural districts.*

ABSTRACT OF DISCUSSION

DR. O. A. LONGLEY: Shipping fever on the Pacific coast is unimportant. I will not say that shipping fever, as we commonly call it, never exists on the Pacific coast. It does exist to some extent but it has been of such a mild type that it responds very readily to treatment. It is very rarely that any precautions are taken in shipping horses up and down the coast. Horses of Washington and Oregon are very commonly interchanged and shipped into California and many carloads of horses go out of California into other states and very rarely is there any trouble in these shipments in the way of shipping fever. The precautions taken are usually those taken for shipping out of any large shipping center like San Francisco and Los Angeles—using the ordinary test for influenza, antitoxin or the bacterins. Inquiry made in the larger shipping centers will bear out this statement. I have interviewed men who have supervised the shipping of a great many horses in and out of California and the only time that danger is expected from shipping fever is when horses are shipped to this coast from the middle west. We have our common outbreaks of influenza but for the last seventeen years these have not been of a serious nature and respond very readily to treatment, especially the more modern and up-to-date methods of treatment.

DR. HOSKINS: Shipping fever in the East is the bane of our existence in dealing with horses in the large markets. I have lived in close proximity to a great sale center in Philadelphia for some thirty years and influenza, or shipping fever, has made up a very large part of my practice. Why, at times, in badly ventilated, badly drained and badly lighted stables, where there are continual shipments day after day, will the disease disappear for perhaps

six to eight months and then just as suddenly appear again? Some years there will not be any evidence of the disease whatever and then, when one would least expect the disease, it breaks out in the most virulent form. I have long advocated, in Pennsylvania, that we should take some steps to compel the railroads to disinfect their cars and to establish at the state line some source of inspection that would protect us from the tremendous loss and suffering. I am personally very strongly inclined to accept the theory of immediate contagion, or the immediate transmission of the disease, for I have observed hundreds of outbreaks in thirty years upon the mere introduction of a horse from the sale stable and sometimes not with any visible lesions of the disease in that horse, but I have been surprised to find outbreaks follow shortly after his admission to a large stable. I highly approve the suggestion made by Dr. Mohler that the Bureau of Animal Industry should take up the matter of this disease and deal with it as it has done with the other diseases he enumerates, because the losses are extremely great in the aggregate to the shippers of mares and horses throughout the land. I do not believe there is a center in the land that sends out as much of this disease as does Chicago. I think they must gather them in from all points of the compass, in all the various forms of the disease and from there they are sent all over the country to the people of the eastern and southern states and the disease is disseminated to an extraordinary degree. That center of dissemination, it seems to me, should be very carefully guarded. I have many times found carloads of horses numbering twenty-one or twenty-two in each car, where the entire carload would show temperatures ranging from one hundred and four to one hundred and seven, waiting for admission to a sale stable in the city with the various lesions showing in one form or another, and later to find the great distribution of this disease throughout that entire stable and generally throughout the entire number of stables because there is a constant traffic in horses between dealers and there is the constant transmission of disease from one stable to another, notwithstanding the precautions taken by our great sale stables. It is high time we took some action towards encouraging Congress to give this power to the Bureau of Animal Industry.

DR. KNOWLES: I would like to ask as to the kind of vaccines to be used in the prophylactic treatment of shipping fever. Some practitioners have used the ordinary polyvalent bacterins and also the old style influenza vaccine and some use influenza serum. I think it would be well to be informed so that we would know how to differentiate in the choice of the material to be used by the practitioner in the field.

DR. HOSKINS: I have seen experiments made along these lines and watched others use every one of the various serums that have come upon the market and I have seen apparently good results in

a number of instances and I have witnessed all of them fail at times. I have religiously tried all of them, sometimes for months at a time and had quite as many unsatisfactory as I have had satisfactory results. I have come to the conclusion that the many instances where I have used them and seemed to have good results for a long period of time—a number of months—that I did not have inactive organisms to deal with. Here I ask a question, whether it is the belief of Dr. Kinsley or Dr. Mohler, if we had immediate contagion or transmission of the disease or if it was intermediate. If we have intermediate contagion or transmission of this disease in the stables which are uniformly badly drained, badly lighted and miserably ventilated, why then did we often get good results from the use of these vaccines, serums and antitoxins? But if these stables do not contain and give forth from time to time the contagious element, then they were of no value whatever and I am strongly inclined to accept this view, that it requires immediate transmission of the disease from the live animal to the other and that it does not lurk very long after the disease disappears from the stable. This is entirely in accord with what I have observed in many large stables—in stables where I have for more than thirty years dealt with this disease.

DR. TORRANCE: I would like to call your attention to an observation I made while I practiced in Winnipeg, a large horse market. The horses came chiefly from two sources; a large number were brought west from Ontario and a large number were imported from the United States, coming from Ohio, Illinois, Minnesota, and from such centers as Minneapolis and St. Paul. It being one of our regulations to require the testing with mallein of all horses coming across the American border, it was noticed by dealers and by veterinarians that the horses which had been submitted to the mallein test were not so susceptible to the shipping fever and did not have such severe attacks as those that had not been submitted to the test, indicating I think, that a considerable amount of reaction to disease in general was set up by the injection of this biological product. There is no connection, of course, between the biological cause of glanders and of shipping fever but apparently the reaction set up in this process had a somewhat retarding influence which helped to protect the animals against shipping fever.

DR. MARSHALL: I do not believe there is a disease with which practitioners have to deal that causes them more trouble than true influenza. I have not engaged in private practice for three or four years but I was engaged in that line for fifteen years previously and one of the questions which has caused me more wonderment than any, is in reference to bacteriologic products in the use or treatment of true influenza and as far as my observation has gone I agree pretty thoroughly with what Dr. Hoskins has said. I never used a biologic product in treating influenza when I thought

I could get better results by any other treatment which I have been in the habit of using. When I wished to undertake to treat a case of the bacterial form of influenza, those which gave me the most trouble were the ones that had been given the various remedies to prevent influenza. When you get a case of pneumonia and try to treat it, sometimes bacterin will help but I do not find it so. I do not know what to do, whether to give heart stimulants or heart tonics. I do not care much for bacterin myself.

I have been wondering if it is the experience of the ordinary practicing veterinarian or if any have had good results in treating these cases. I would be very glad to know about it. While we were abroad last year, we visited many of the veterinary colleges and in some of these colleges they had a great deal of trouble with influenza. They had more cases of influenza than we ever had in the state of Pennsylvania. They spoke of using salvarsan, and neo salvarsan, but the main objection to using those things was the expense. It cost about ten dollars for one dose. Of course one dose was usually sufficient but they did not feel warranted in using a dose at that price for a bad case of the bacterial form of influenza.

DR. LONGLEY: The fact is very apparent that there is something lacking in our present method of treating influenza. Since the cause, whatever it may be, has never been definitely isolated, treatment by bacterin cannot be successfully carried on to any great extent. It cannot be specific. We have found from experiments with cases in the United States that leukocytic extract has given better results than any other kind of treatment used in connection with and without bacterins or serums. It can be used in connection with the bacterins and with serums and seems to reinforce their action. In cases treated with this leukocytic extract alone, the results have been better than the treatment by any other form.

It may be possible when used in these different types of shipping fever, it may prove to be of much greater value than vaccines or antitoxins.

Referring again to Dr. Mohler's paper, it seems to be desired in treating cases of shipping fever to stimulate those body cells which will produce immunity and we claim that action for leukocytic extract. In fact, it has been definitely proven that injections of leukocytic extract will increase the number of leukocytes and stimulate the action and must of necessity result in beneficial results.

DR. ELLIS: In one of the city departments with which I am connected, we have about twenty-five hundred horses distributed in a number of stables under the care of seven different veterinarians and each veterinarian has a free hand to use his own methods. When the horses come in they are all put in a receiving stable for a certain length of time and then distributed. Whenever we get green horses soon after the distribution, we usually have this

condition to a greater or less degree in the twenty-five stables. Some of them are treated with biologic products and some are not, probably an equal number each way. In fact, I think less of them are treated without it than with it. Some are often treated with autotherapy. The chief veterinarian of our department is an advocate of that method of treatment and the results seem to be about the same in all stables.

Whenever the veterinarians get together and talk about their cases they seem to have treated about the same number and have had about the same results, so it does not seem to me there is a large difference in regard to the biologic treatment of this disease. Some are treated to immunize them and some veterinarians of the department claim that they have had more trouble acclimating horses which have been immunized than those which have not. In other words, they claim that immunization is bad, others claim it is good so there is a difference of opinion.

DR. JENSEN: Gentlemen, I regret very much that these papers could not have been taken up yesterday, for a gentleman who is a member of the corps of British veterinarians, purchasing mules for his government at Sacramento, was here for the purpose of listening to what he could learn and if possible to tell some of his experiences. The gentleman bought mules, I presume a conservative estimate would be fifty thousand head, since last October and in such a business he, of course, has had very rich experience in handling a large number of animals.

I expect this gentleman, in particular, while very familiar with the work that has been going on at the purchasing depot at Lathrop, Missouri, has a great fund of information in reference to the value of bacterial vaccines. I believe I can speak with some authority because I have the word of a half dozen men who have used vaccines, that as a prophylactic agent they find it quite valuable but as a curative agent they have not laid much stress on it and they have a very complete record of the work that has been done.

The horses and mules bought in Kansas City were most of them immunized with bacterial vaccine. They were then re-shipped to Lathrop, Missouri, as a short trip in the country before having them shipped to New Orleans or other points for shipment across the water, so these men have in their possession reports of all horses and mules vaccinated and those not vaccinated. They also have reports from the receiving veterinarians at New Orleans giving the number of cases that took sick after arriving at New Orleans, or on the way or have been vaccinated at New Orleans as well as all animals that were not vaccinated. The reports show very conclusively that those which had been vaccinated or were treated with one of these biological products, had stood the trip much better, and even a less number became sick, although some of them got sick after vaccination, but there was a marked difference in favor of those that had been vaccinated.

I will not give you any specifics because I do not know of any but I do feel that the observation of so many hundreds of horses that have been sick ought to be worth something. I was consulted quite often by these gentlemen. They had quite a few losses and the bacterial form of the disease was very much in evidence. There is, by the way, one form of influenza that has not been emphasized. I refer to the enteric form. I do not know whether that was mentioned by Dr. Kinsley or Dr. Mohler but whenever that condition is present, the animals nearly all succumbed. Very few of them are restored.

Coming back to the bacterial form, I may say this, the treatment adopted by these gentlemen, to the exclusion of nearly everything else, is the intramuscular injection of camphorated oil and the results have been marvelous. I am very sorry Dr. Stent could not be here to tell you about it. They have adopted that treatment to the exclusion of nearly everything else.

In complicated forms where there is a ropy nasal discharge and an offensive odor, in place of injecting the camphor intramuscularly, they have been injecting it into the trachea and in various cases they combine guaiacol and creosote. They have given up the guaiacol on account of the price it has attained since the outbreak of the war. I wish to say that the information these gentlemen have given us was of such value that I think you practitioners ought to know about it and see if you cannot obtain as good results as they have.

When these cases are brought to their attention the camphor is given perhaps three times a day to begin with and later just as they need it. Nothing else has been done except to pay attention to the hygienic surroundings and the sanitation.

Speaking with the gentlemen who were at the meeting with Dr. Stent, yesterday, what do we claim for camphor? We know it is a satisfactory stimulant to the nervous system. I have used it in my practice a long time.

Camphor, besides being one of the most efficient stimulants of the nervous system, also increases leukocytic efforts.

DR. MOHLER: The use of large quantities of camphorated oil has been recommended by Dr. Farris of Germany.

DR. FROTHINGHAM: I would like to ask Dr. Marshall what the results have been from treatment by that method in Pennsylvania.

DR. MARSHALL: I am heartily in favor of camphorated oil. I believe it is one of the best treatments used. I cannot give the numbers treated, nor the statistics, but just from my general impression, it is the best treatment of the bacterial form of influenza.

DR. HOSKINS: I want to say that every graduate of the American Veterinary College who has gone out of that college during the last thirty years, has been impressed with the high value of camphor in the treatment of pneumonia, and of nux vomica and of

creosote in various forms, in all of these conditions and I believe they use it. I believe we have had uniformly good results with that course of treatment.

DR. KNOWLES: It has been my custom to use camphor in prescriptions in the treatment of influenza but I did not understand what Dr. Jensen and others had reference to in the use of camphorated oil. I would like to have Dr. Jensen detail the method of treatment with camphorated oil.

DR. JENSEN: There is an official preparation in the pharmacopoeia which I would not recommend. The question resolves itself into how much camphor you want to give and simply make a solution of sterilized oil. Then inject it into the muscle. Use an oil of light specific gravity. The heavy specific gravity oils are not so easily absorbed as the lighter. Pure olive oil is the best. Two grams of camphor dissolved in sufficient oil to make ten c.c. You can increase or decrease the dose to satisfy yourself. In fact certain German writers suggest giving more than that. It should not be put in the subcutaneous tissue but deeply in the muscle and if you are not careful, abscesses will follow. In combination with creosote we take a gram of camphor and a gram of creosote and take enough oil to make a good solution. It is the usual experience to get better results by injection directly into the trachea. It does not cause sore tissues. I frequently see reports of the use of combinations of phenol with camphor by makers of proprietary remedies.

DR. SCHULTZ: In 1907, I was in Berlin and I saw Dr. Frohman in his clinic, treating cases of shipping fever with strong camphorated oil. The camphorated oil was in a solution of one to four, or five, and steers received in twenty-four hours, 100 grams of camphor besides the oil subcutaneously. When I came to the United States I used that treatment but I did not give a gram as stated here. I never thought of giving a horse less than twenty-five grams of camphor in about one hundred and twenty-five of oil subcutaneously. I had good results and no abscesses occurred. I gave some intramuscularly but there is more danger of abscess by that method and I follow Frohman in his therapeutics. His latest book has not been translated yet but he recommends one pound of camphor in four pounds of oil. It is too strong. You cannot get the camphor in solution. I take a bottle of creosote and put camphor into that and place it in a warm place. It will dissolve in two or three days and then I simply use that saturated solution of camphor in creosote to put in my oil, but I am surprised that any one has got results from one gram.

I would give this camphorated creosote mixture about fifty c.c. taken with about one hundred and fifty of oil, maybe one or two doses a day and I have never had any bad results.

Four or five years ago when I was in Seattle, I treated a good

many cases with good results. I do not think it has any specific influence but it prevents complications. As soon as you have processes in the lung, a filling up of a part of the lung but without pharyngeal lesions, the fever varies and the patient is better one day and worse the next—that is when I give camphor and I have very good results.

DR. JENSEN: In regard to treatment and doses, if you are going to compare doses with German writers you will be very much at sea. We American veterinarians do not give as big doses as the Germans do.

Twenty-eight years ago a young gentleman came from Sweden. He located in my community and he prescribed three grain doses of eserine sulphate. I think that is too much. First of all, if you try that on an animal you will get out of the notion very hurriedly, and secondly, I do not know whether our horses would stand much of it. I think the idea is not to see how much we can give without killing but rather how little can be given and get good results and I assure you a two-gram dose of camphor has been eminently satisfactory.

DR. ELLIS: Dr. Jensen's remarks about the treatment and doses remind me of a discussion we had in our New York City meeting at one time on the use of arecolin.

Someone told us a dose of arecolin should be two or three grains. He seemed to think two grains would be the minimum dose and the most of us thought half a grain would be about a dose. In the treatment of these cases, I have used for a great many years, camphor and ether, small doses of camphor, probably fifteen grains of camphor and a gram of ether. In lung cases or with a complication of lung trouble, and in a case of pneumonic influenza, I always thought I had very good success.

There is another phase of the influenza cases that has come to my attention as frequently as the bacterial form, and that is the enteric and they did not all die by any means. When they got well they seemed to be subject to colic for quite a long while. They were very troublesome horses and in the treatment of them we found very good results by giving vaseline. We gave an ounce of vaseline by capsule probably three times a day and kept it up for two or three weeks. We have had horses convalescent and going to work which every once in a while, would get colic and we gave this treatment of vaseline for two or three days and longer.

DR. JENSEN: The enteric form I have seen come to a fatal end so rapidly that even camphor would not do any good. As to the vaseline, it undoubtedly has its merits but you do a lot better by giving liquid petrolatum.

DR. R. C. MOORE: This discussion of influenza and the statements made about the use of camphor and particularly what Dr. Ellis has said about the addition of ether, carries me back to my earlier days in Kansas City.

Along about 1896, there was a great deal of influenza in that city. The death rate was extremely heavy, so much so that the horse dealers were fearful that the disease was going to put them out of business. The line of treatment used in those days was almost entirely sedative. Aconite, acetanilid and other treatment was used to lessen the temperature.

About that time a layman who had been working in the stock yards for two or three years, made a trip to the country somewhere out in Kansas, I think, and came in contact with a clever old lady who was running a boarding house. She gave him a formula which she said would positively cure the disease. She made up this formula and sold it and that lotion nearly put the veterinarians out of business. This man afterwards sold one-fourth interest in the company which he had established for the making of this preparation, for a quarter of a million dollars. This formula probably contained camphor, sulphuric ether and raw linseed oil.

I believe the greatest results obtained from that so-called wonderful treatment, was the fact that it stopped the use of those agents that were helping to destroy life. I stopped using the sedative agents in the treatment of influenza. No matter where the temperature went, I let it alone and if I got hold of a case which had not been tampered with, I rarely had trouble.

As to camphorated oil, I have used that and I have used other agents of a mild stimulative nature and usually with good results.

DR. HOSKINS: I have witnessed the death of more animals that were treated with these magic preparations, loaded down with aconite, along about the years referred to, from 1890 up to 1900, than ever died in our neighborhood from the disease itself. In connection with the treatment that has been referred to, I wish to say that our college has advocated and has been dispensing barrels of a mixture of sweets spirits of nitre, aqua ammonia, etc. with uniformly good results.

DR. KINSLEY: In our section—the middle states—some of us are inclined to believe that shipping fever is distinct from the disease ordinarily termed influenza. Influenza, as we usually think of it, is a disease originally known as pink eye, in which there is much edema of the lungs, infected mucosa, particularly of the eye along with very marked depression and rise of temperature. We see this disease still. Possibly I may be mistaken, but we have in our section this other disease, ordinarily termed shipping fever, which is very constant in horses which go through public stock yards and it is not uncommon to find complications of the old type of influenza or pink eye and the so-called shipping fever.

Dr. Mohler has in most of his descriptions, described influenza with these complications, due to bacteria that we ordinarily associated with shipping fever. This season we have been visited with the old fashioned pink eye.

To my knowledge this disease extends in all directions from Kansas City. We have also had an abundance of the so-called catarrhal or shipping fever, which is primarily an inflammatory disturbance of the anterior respiratory tract with or without pneumonia and pleurisy. We have had an abundance of that, caused by the collection of large numbers of horses and mules there to be shipped to Europe for war purposes.

So far as the etiological factor, that I have been able to determine, is concerned, I know others have substantiated it, and in fact, I substantiated some other findings.

Dr. Hoskins asked whether or not shipping fever could be transmitted from barns that have been infected to animals that are taken into the barn. Yes, that has been observed in cases of animals which were apparently healthy. It is not possible to say positively that the animals were not infected when taken in but animals coming in from healthy quarters, taken into some of these barns, contract this so-called influenza and shipping fever. This is probably due to a filterable virus and is also transmitted from the surroundings to the animals. At least, that has been our experience in Kansas City. That is the indication. We have not absolute proof that these animals were not infected when they were led in there. They were healthy horses taken from premises where diseases of this nature did not abound and they contracted the disease.

I believe the difficulty which Dr. Hoskins and Dr. Marshall and Dr. Ellis have in the far eastern cities is due to the fact that those animals are already intensely infected when they reach those places.

A great percentage of those horses are shipped many miles so they are intensely infected when they arrive and immunization of already infected animals with active immunizing agents is not successful. On the other hand, as Dr. Jensen pointed out, if these healthy animals can be taken in their native state and immunized, I believe they can be shipped a considerable distance and through the various stock yards and that they are thoroughly well protected against so-called shipping fever, not influenza, in which the filterable virus is the cause. I believe they can be fairly well protected, but, as I stated in my paper that immunity is of relatively short duration. It is only apparently a passive immunity so far as time is concerned. It stimulates the reaction in the animal's body.

Dr. Torrance spoke in relation to mallein. I cannot quite recall the circumstances but Dr. Brown of Kansas City, has told me on different occasions, of the influence of the mallein test on these cases of shipping fever. I would like particularly to have Dr. Mohler discuss this problem, for I may be altogether wrong in the assumption that we are facing two diseases.

DR. R. C. MOORE: I would like to ask in regard to the statement as to short immunity, whether that would apply to the use of bacterins in the prevention of strangles, where it is pure strangles, rather than shipping fever.

DR. KINSLEY: My judgment is, it applies to that condition if the animals remain in their normal habitat. I believe their immunity is sufficient to guard them in a short time from either shipping fever or strangles but they are usually very susceptible to other diseases.

DR. R. C. MOORE: I have been using Dr. Kinsley's own make of bacterin in treating outbreaks of strangles on farms where there were quite large herds of horses, with very good results but I do not recall a single case where I have treated a whole herd of horses but that the disease was soon eradicated. Within as much as two years, do I recall a single case of an outbreak on those farms afterwards. Whether the immunization was due to the treatment they had received I cannot say but I asked the question to find out whether the duration of the immunity was as short in that case as it would be in the case of shipping fever.

DR. MOHLER: With reference to the question asked by Dr. Knowles, as to the best biological product to be used in connection with this disease, I am not able to answer. I consider the most important organism to be included in this product must be the various forms of streptococcus, which are found in horses infected with this disease and which should be shown to be wholly without other contaminating organisms.

In reference to Dr. Hoskins' remarks as to the immediate or intermediate transmission of virus; I think it is unquestioned that the animal itself carries more than ninety percent of the virus. In other words, a large percentage of the virus is immediate but the fact that I mentioned, the necessity of disinfection of stables and cars that are carrying the animals to eastern markets is conclusive to my mind that only a part of the infection is immediate. I think that very beneficial results are obtained by disinfection of the stables, cars, and barns, also of the National Stock Yards. The results accomplished in Kentucky by the thorough disinfection of all stock yards, stock barns, and cars which brought horses and other stock into Kentucky, would indicate that a certain portion of the virus was intermediate.

With reference to the question raised by Dr. Kinsley, as I have previously stated, the only way I could compare the diseases known as influenza or shipping fever, is to make analogy with the grippe. I believe the pink eye that Dr. Kinsley is referring to as pneumonic conjunctivitis and the associated lesion that we have in the human family of persons affected with grippe, are very similar.

The shipping fever which Dr. Kinsley refers to is merely the catarrhal form of influenza as I described it. I think we have a large number of symptoms of influenza which are known by various practitioners under different terms and while I did not mention the intestinal form of influenza, in my paper, I included that also in the etcetera.

THE OUTLOOK FOR THE CONTROL OF CATTLE ABORTION*

W. L. WILLIAMS, Ithaca, N. Y.

No adequate basis can be laid for measuring the possibilities of controlling an infectious disease until the disease itself has been clearly defined. Its geographical distribution must be known, its frequency within the involved territory determined, the character of the disease understood, and the usual time and method of transmission adequately recognized.

Contagious abortion of cattle has not been clearly defined. Many writers say that contagious abortion is present in a herd when ten to fifteen cows are observed to abort in a herd of twenty-five to forty animals. These writers seem to be very definitely of the opinion that twenty-five or thirty per cent of observed abortions in a herd of twenty-five or more cows is conclusive evidence of the presence of the contagion. If, however, in a stable of two cows, one, or fifty per cent, aborts, many of these writers would consider the abortion accidental. The attitude appears very peculiar. In other chronic contagious diseases, we consider one typical case conclusive evidence of its existence, regardless of how many other animals may be present. If we observe one typical case of glanders in a group of one hundred or one thousand horses, it is just as truly contagious glanders as if there were many cases.

Some writers admit that a distinction should be made between abortion, the disease, and abortion, the phenomenon. They admit that the infection may exist and not cause the phenomenon of abortion, but whenever they attempt to measure the intensity of the disease they use the phenomenon of abortion, the death and expulsion of the immature fetus, as the sole standard. They ignore, when they come to measure the disease, those cases where the infection exists without causing abortion, and they ignore equally all those cases of abortion which are not observed. During the first half of pregnancy, the embryo, or fetus, is so small that it may be dropped in pasture or stable without observation. As the tufts of the chorion are too small to favor incarceration, the fetal membranes are expelled with the fetus and no traces of the disaster are left in the form of retained membranes. Such abortions therefore,

*Read at the Conference for Veterinarians at Ithaca, N. Y., Jan. 12, 1916.

under the plan named, are excluded in the measurement. After the seventh month of pregnancy, the fetus is frequently expelled alive. This is classed as a premature birth, not as an abortion. The approximately mature fetus may be expelled dead. This is designated as a still birth.

Owing to these exclusions during the first half and the last quarter of pregnancy, most writers are led to state that abortion is most common from the fifth to the seventh months inclusive. It would be more accurate to state that, according to the narrow definition which is given of abortion, it generally occurs during this time.

Many of our foremost investigators and writers upon contagious abortion, as Bang, M'Fadyean and Stockman, Wall, and others, speaking from a pathological standpoint, define contagious abortion as an inflammation of the uterus and chorion in pregnant cows, and either directly state or indirectly intimate that the *Bacillus abortus*, which they assert causes the abortion, can live and multiply only in the gravid uterus. A series of contradictions arises. Bang found the organism inside a mummified fetus after a long duration of time, and also quotes with approval the observations of Poulsen, where, after cows had aborted and were not bred until several months later, he had avoided abortion in the succeeding year by disinfecting the uterine cavity, presumably several months after abortion.

M'Fadyean and Stockman apparently believe that the organism will remain virulent for weeks and months outside the genital tract, but will live only a few weeks within the genital tract, where it exerts its chief destruction.

In general, most writers admit that the specific pathologic lesion in connection with abortion is metritis. They largely deny that the chronic endometritis so common in sterility in cows is contagious abortion. This denial is in spite of the very clear clinical fact that cows which are temporarily sterile are exceedingly liable to abort unless, prior to conception, the uterine cavity has been thoroughly disinfected. The writers admit also that retained fetal membranes is a common complication of contagious abortion, but are unwilling to accept retained fetal membranes as one of the fundamental symptoms of the disease. They hold, directly or indirectly, that retained afterbirth accompanying parturition at full term is not contagious abortion. Clinically, and in post-mortem examinations upon the killing floors of abattoirs, we know that a

specific metritis of cows is exceedingly common. We find this identical in all macroscopic characters with the specific metritis which is present in known abortion, where the typical exudate of contagious abortion exists.

Any definition of contagious abortion yet given by our principal writers upon the subject is exceedingly contradictory and unsatisfactory. Some typical clinical observations, in conjunction with post-mortem and bacteriological study, will serve to illustrate the confusion existing in what we mean by contagious abortion.

We observed a valuable Holstein cow in the act of expelling a fetus at about the end of the eighth month of pregnancy. When labor set in and the amniotic sac had ruptured, the stall was flooded with thin, dirty fetal feces. Apparently there was between five and ten gallons of this semi-fluid substance. The fetus had suffered from scours and had distended its amniotic sac with feces. The genital passages of the dam were dilated. The fetus was alive and vigorous. It presented anteriorly and lay in the dorso-sacral position, the anterior feet and the head properly extended. The presentation and the position were normal. The expulsive powers of the mother were in abeyance. Slight traction, less than sufficient to lift the fetus, sufficed to extract it. The umbilic cord was not ruptured in extracting the fetus. The fetus was vigorous and struggled actively. We severed the umbilic cord and the fetus immediately expired. It did not breathe. An autopsy made immediately showed the alimentary tract enormously distended with fluid feces. The lungs were very dark, apparently hepatized. The spleen showed numerous hemorrhagic areas beneath its capsule identical with the appearances usually observed in an aborted fetus. The bronchii yielded pure cultures of the *bacillus abortus*. The dam appeared somewhat ill, though not severely so. The space between the uterus and the chorion was filled with the typical exudate of contagious abortion. She had retention of the fetal membranes, and died from acute septic metritis.

The cow did not abort, and consequently, according to the definition usually given, had not suffered from contagious abortion. She had not given birth at full term. Some would have designated this as a premature birth, but that would depend again upon what definition one would give. Unquestionably there was a fetus expelled and it was alive when expelled, but it is not clear that it was born. If we define birth as an expulsion of the fetus from the

uterus, then we might term this a premature birth, but if we define birth as the expulsion of a living fetus which continues, for at least a brief period, to live after the umbilical cord has been severed or after the connection with the uterus of the mother has ceased, or at any rate draws a single breath, then the fetus in question was not born at all, but merely expelled. We have no term for the disaster which we have described which adequately defines it. Both the dam and the fetus perished. According to the generally accepted definitions of contagious abortion, neither of them had that disease. Yet both perished and the outstanding infection recognizable in each was the *Bacillus abortus*. Many writers are very, very positive that abortion normally involves the pregnant cow only. Here, however, a fetus which was expelled alive died, and the only recognizable cause for its death was the *Bacillus abortus*. The fetus was not a pregnant cow. It was a male fetus, and so could never have become pregnant.

In two other cases, which we have recorded in our annual report for 1914-15, two calves which were born at full term or approximately so, became ill and died, one at two and one-half days and the other at four days of age. They suffered from digestive disturbances and from severe multiple arthritis. The arthritis was typical of the acute arthritis of navel infection, but extraordinary precautions had been taken to prevent navel infection. Upon post-mortem examination, each of these calves revealed the typical lesions of a fetus which has been expelled because of contagious abortion. The contents of the articular cavities yielded pure cultures of the Bang abortion organism. One of the calves might have been termed a premature birth, having been expelled at 272 days, but the other one was carried to the 286th day. At least, it must be said that they were not aborted. They were not only alive when expelled, but were fairly vigorous, and would have passed as normal at the time of birth. They remained apparently normal for one or two days. The outstanding infection in each of the calves was the *Bacillus abortus*, but, according to the writings of many of our chief investigators, calves of this age should not have contagious abortion. As they cannot be pregnant, the organisms cannot multiply in the gravid uterus. Moreover, M'Fadyean and Stockman are especially insistent that the bull plays no part in the dissemination of contagious abortion, or, if he does play a part, it is merely that of a passive carrier. These calves were both bulls. The ques-

tion is, "Did they die from contagious abortion, and if not from contagious abortion then what was the cause of death?"

Other elements have more recently entered into the question of the diagnosis of contagious abortion, without, however, having been included in the current definition of contagious abortion. It has been shown by Schroeder and Cotton and others that the *Bacillus abortus* quite commonly exists in the milk of dairy cows. It has not been stated that a cow whose milk contains this organism has contagious abortion. It would certainly not fit well in the ordinary definition of that disease.

We also recognize now, as having an interesting, if not practical relation in the diagnosis of contagious abortion, the agglutination and complement-fixation tests. When a writer attempts to define contagious abortion, however, he does not define it in such a manner as to include all animals where a reaction to one of these tests is obtainable.

Of all diseases known to veterinarians or to human practitioners, contagious abortion of cows is perhaps defined in the most ineffective and misleading terms. We have defined contagious abortion as a wide-spread chronic infection of cattle, involving, largely, but not alone, the genital organs, causing an exceedingly varied group of symptoms, amongst which there stand out prominently sterility, abortion, premature birth, and, accompanying these as a fundamental pathologic condition, metritis, with or without retained afterbirth.

We must furthermore recognize the geographical distribution of the disease and the frequency with which it occurs in the involved area before we can hope to arrive at a safe conclusion as to the possibilities of control. In most diseases, isolation, quarantine or other police measures constitutes one of the chief elements in the control. Quarantine, however, can be effective only because there are areas which are free from the disease and other areas which have the infection. In connection with contagious abortion of cattle, the views of writers and observers upon the distribution and frequency of the disease are as varied as the definition. Time and again, we read that it is uncertain when the disease became introduced into a certain country or community or herd. In other cases, very definite statements are made regarding when the infection has been introduced into a herd, and its precise date and manner have been related. Evidently if these statements were well

grounded quarantine might have prevented the introduction of the disease. If, however, we make diligent inquiry, we find that abortion exists in every country in the world regarding which we have any definite information. Wherever domestic cattle are grown and used, so far as we know, contagious abortion exacts its toll upon the breeder and dairyman, and, it does not matter what definition one gives, the toll is nevertheless exacted.

When we speak of individual herds, however, questions arise which it is difficult to answer. If we accept the current definition of contagious abortion, which we might say means approximately twenty to thirty per cent or more of observed abortions in a given year, most herds of twenty-five or more breeding females come within the definition every few years. If the definition which we have suggested be accepted, and we include as being equally important sterility, abortion, premature birth, and metritis, with or without retained afterbirth, all breeding herds are involved. If we say that a cow has contagious abortion when her milk contains the *Bacillus abortus*, so far as we know at present, each herd of any size has contagious abortion. If we turn to the other standard of measurement and accept as our basis the agglutination or complement-fixation test and we base our diagnosis upon a single test some herds will be classed as free, but if we make a persistent search by means of repeated tests, then all herds of cattle, according to our researches, are infected with contagious abortion, and by the same token, as we have stated in prior communications, essentially all cattle are infected. In one sense, however, we may recognize the introduction of abortion into a herd. The infection present may be mild and causing little loss, while the introduction of an animal having a very virulent infection may precipitate a serious disaster.

Before we can arrive at any reasonable conclusions regarding the control of the disease, we need also to learn its character, the date or epoch at which the infection occurs, and its method of transmission. The character of the infection itself is reasonably agreed upon. The *Bacillus abortus* described by Bang is almost universally recognized as the causative agent. There are a few persons who insist that the granular venereal disease, or infectious vaginitis, is the essential cause, and that this infection is distinct and unrelated to the organism described by Bang. So it occurs that in our literature some writers are very emphatic in saying that in certain regions the granular venereal disease is the cause of much abortion

and that the *Bacillus abortus* is not present, and a greater number state with decided emphasis that the *Bacillus abortus* is the cause of essentially all contagious abortion and that the granular venereal disease has nothing whatever to do with it. They are dealing, on the one hand, with a biological factor, a bacillus, and upon the other hand with a pathologic lesion. The two elements co-exist essentially universally. It has not been shown that they are identical nor that they are distinct. The apparent conflict of these two views is wholly superficial. The two views may be in conflict, and they may be identical. The most that can be said at present is that they are inseparable. Any measures which we may take to eliminate the *Bacillus abortus* will simultaneously eliminate the granular venereal disease, and vice versa. This does not indicate their identity. The date of infection and the means by which the infection is transmitted are also of great practical importance. In this respect as well as in most other phases of the problem, an accurate knowledge of the biology of the disease is of very great importance.

There is great confusion regarding the epoch and vehicle of transmission of contagious abortion. The confusion arises largely from the definitions which we have already cited. Almost all bacteriologists who have worked with contagious abortion announce the recognition in the aborted fetus of the *Bacillus abortus*. While it is not constantly present, nor even generally present perhaps, yet its recognition has been so frequently reported that the general statement needs be accepted that an aborted fetus may contain the organism within its body at the time of expulsion. It would be difficult to draw the conclusion that if a dead fetus could have in its body the *Bacillus abortus* a living fetus might not also have this organism in its organs. The calves which we have already described carry this evidence a step further. We have shown in the one case that the *Bacillus abortus* was present in the lungs of a fetus expelled alive at about eight months. Had its lungs been capable of inflation, there is no known reason why the fetus might not have lived. Had it lived, the *Bacillus abortus* was present to begin with in its organs.

In the two calves under experimental observation which we have already cited, the one dying at two and one-half and the other at four days of age, born at full term, we recognize again in the joint cavities of the calves the *Bacillus abortus*. The precautions taken in the one calf eliminated so far as was humanly possible the

danger of post-natal infection, and according to the evidence attained it must be concluded that the calf was born with the *Bacillus abortus* existing in its system. In the other calf, which lived four days, and was fed upon raw milk, the infection may have been obtained through the milk, but was probably pre-natal.

Proceeding a step further, numerous investigators have shown that the *Bacillus abortus* is a common contamination of the milk of dairy cows. It has also been clearly shown that the discharges from the genital tract of a cow immediately after parturition more or less generally contain the *Bacillus abortus*, especially when the cow has aborted. Cows which have aborted are frequently used as nurses for calves from other cows in order to save the milk, which it is not desired to place on the market, or the milk from such aborters is fed to calves, either alone or mixed with the milk of other cows. This is especially true when there is retained fetal membranes with a repulsive discharge which renders it undesirable to place the milk upon the market, where dairy inspection prevails.

According to the definition which we have given on contagious abortion, practically all cows which have metritis have contagious abortion. In our definition of metritis we include, as most writers do not, the scarlet-gray and other discharges which are very commonly observed after parturition and are designated as lochia. These emanations from the genital tract do not occur in a typically sound animal. Whether these discharges be scant or voluminous, the constant tendency is for them to ooze down along the tail, thighs and udder and contaminate the exterior of the teats, so that the calf in sucking the cow or a milker in drawing the milk for the calf inevitably gets some infection into the milk. We have thus two sources of milk contamination with the *Bacillus abortus*;

- (1) The milk within the udder may be contaminated, probably originally through the teat canal from the discharges coming from the genital tract, and,

- (2) The milk is contaminated by the *Bacillus abortus* from the exterior of the teat and udder.

The calf, in feeding upon such milk, inevitably ingests the infection. According to our investigations in herds where abortion prevails, the blood of fully ninety per cent of the calves grown upon raw milk reacts to the agglutination and complement-fixation tests for contagious abortion. Furthermore, according to our studies, the infection persists. It becomes somewhat dormant in

many calves after they pass approximately the one hundredth day, and are placed largely upon vegetable foods, and is aroused again at the time of copulation. The reaction then remains high until the pregnancy terminates. In such cases, according to our observations, if the blood reaction in young heifer calves is high, the rate of abortion in the first pregnancy of the grown heifer is correspondingly high. This epoch of invasion has not yet been accepted as of importance by veterinarians and breeders. The evidence at present, however, points with very great emphasis to this epoch as the most highly important in the course of the spread of the disease.

A second epoch of dissemination, which has been largely discussed, is that of the first pregnancy. M'Fadyean and Stockman especially, along with numerous other writers, believe that the frequency of abortion in first pregnancy is due to the ingestion of contaminated food. They do not say how or when it has become contaminated, but they apparently believe that the herbage which the pregnant heifer eats has in some way become contaminated with the *Bacillus abortus*, and, taken into the digestive tract, passes to the uterus and sets up pathologic processes which eventually bring about abortion. Our experiments upon this point have been exceedingly scant, but so far as our studies have been carried it has appeared that heifers in first pregnancy offer a distinct immunity toward infection through the alimentary tract and the disastrous infection must be referred back to contaminated milk instead of to contaminated herbage.

The conflict between these two epochs of infection is superficial. Essentially, they are the same, the infection through the alimentary tract. There are certain important differences in the data. In the case of infection by the ingestion of milk, we have the clear and indisputable evidence that the milk is commonly contaminated. We do not, however, possess any material evidence to show the contamination of herbage which the heifer in first pregnancy may eat.

Another means of transmission of the disease which has been vigorously asserted, and equally vigorously denied, is the contamination by copulation. The belief here is exceedingly varied. Some believe that the bull is capable of direct transmission of the disease, that is, that he himself is infected and that the seminal emissions bear the infection. Others claim that the bull may merely be a passive carrier of the disease and not at all actively concerned

in it. Yet others believe that contamination by the bull is of no consequence whatever and may be completely ignored. In our studies, where we have tested the blood of bulls by the agglutination and complement-fixation tests, the blood of each breeding bull has ultimately reacted. We may make one or two negative tests, but if the case is persistently followed ultimately the blood reacts. If we accept this as a definition of contagious abortion, then the bull must have the disease, and just why he should not transmit it, it would be exceedingly difficult to state. If we resort to the blood tests upon bull calves, we find in herds where abortion is rampant, that the blood of most of these reacts at a period between twenty and one hundred days of age, and we have no evidence to show that the infection is ever completely eliminated, though we have excellent evidence that it becomes somewhat dormant during the period beginning with the placing of the calf largely upon herbaceous food and that it is aroused at the beginning of his use for breeding purposes.

Those who claim that the bull is a negligible factor in the dissemination of contagious abortion must ignore much clinical evidence of very great importance. In a large herd where we have excellent data, two hundred cows were purchased from small herds in Canada and imported to the state of New York. Naturally, many of these were pregnant, and many were not. During the first nine months, that is, during the time in which the pregnancies which existed at the time of purchase were normally to terminate, the abortion rate in this group of cows was less than four per cent. Those which were not pregnant were bred to sires which had been in use upon the farm, where abortion had long been severe. When pregnancy began to terminate in these, the abortion rate rose to twenty-six per cent, or approximately eight times as great as it was in the cows which had been bred in Canada.

On the same farm abortion had long been severe during first pregnancies, the average having been about fifty per cent. A change was made in the plan of feeding the newborn calves. When these grew and became pregnant for the first time, the abortion rate dropped to nine per cent. They were bred to young bulls which had not been used previously for service, or at least to no great extent, and were presumably healthy. Just at present some of these heifers which carried their calves so well during first pregnancy are aborting very heavily in their second pregnancy. Their sec-

ond breeding was to older herd bulls which had been used extensively upon cows which had aborted or been sterile or had metritis, with or without retained afterbirth.

Other evidence equally suggestive might be brought forward. It appears to us that this evidence is too important to be ignored, and that we must conclude that the bull plays a very essential part in the dissemination of the disease. In other words, we are opposed to the hypothesis of an infectious disease which confines its ravages to one sex and in which the contamination must always occur between individuals of the same sex. Neither can we well conceive of a disease which can be transmitted only at a certain period in the life of the individual. It is in conflict with our knowledge of other transmissible diseases.

Another method of transmission of the infection, which has been the chief one in the popular mind throughout the history of the consideration of this disease, is the infection by co-habitation. It has been long believed and emphatically asserted that if a cow aborts and is permitted to remain in a stable with other pregnant cows, if it is really contagious abortion, a large proportion of the other cows in the stable will quite certainly abort. The evidence upon this point is clinical and is exceedingly inaccurate. If in a given herd a cow aborts and then a short time thereafter numerous other cows abort, the evidence is considered conclusive by the veterinarian and breeder that the first animal aborting had contagious abortion and that the succeeding abortions were a direct consequence of the first abortion.

If, on the other hand, a cow or heifer aborts in a stable among other pregnant animals, and few or no abortions follow, it is then decided that the animal which aborted did so accidentally. It is then recalled that the cow which aborted had slipped or had been gored (at least, the dairyman remembers having seen some animal gored before the one aborted, and, while he has kept no definite account, it fits very well with the animal which has aborted), or some other accident has been invoked to account for the abortion. Slips, gores, and other accidents are so universal in cows and other animals that they can always be used as explanations for the occurrence of abortion. In attributing these cases to accidental abortion, the interesting fact that no case of accidental abortion has ever been verified by post-mortem examination is ignored. If it were admitted that a solitary abortion might just as well be con-

tagious as accidental and that repeated abortions might just as well be accidental as solitary abortions and that we have no proof that accidental abortion has ever occurred in any cow, it would probably clear to a great extent one of our misconceptions, and would leave us in a better position to judge of the importance of cohabitation in the spread of contagious abortion. In our experiment herd we find that if a pregnant animal is sound she may run with other animals which abort, she may slip, she may be gored, she may be fed experimentally upon abortion bacilli, but she does not abort. On the other hand, we observe that in many herds aborters are habitually isolated, and it is interesting to observe that abortion is most frequent and persistent in those large herds where there are great numbers of heifers in first pregnancy and where for years it has been the custom of the management to isolate aborters from the rest of the herd. Paradoxical as it may seem, it would be safe to say that, in those herds where the greatest care has been taken to separate aborters immediately from the remainder of the herd, abortion is most prevalent and severe. It is not because the aborters have been separated, but because the infection of abortion is so severe in those herds that the management is fully convinced of its contagious character, and then undertakes to control the infection in a manner wholly out of harmony with the character of the infection and having no relation, so far as we can observe, to the actual method of transmission.

We have contended for years that if the uterus is clean at the time of conception and if this clean uterine cavity becomes sealed, which requires a period of less than thirty days, it is almost if not wholly impossible to disturb the course of pregnancy by means of infection. Apparently there is conflicting evidence upon this point, and much has been made of that apparent conflict.

In other contributions, Dr. Moore and the writer have recorded certain experimental attempts in the production of contagious abortion. Dr. Moore injected into the jugular veins of five cows pure cultures of the *Bacillus abortus*, and all five animals aborted. The writer at about the same time injected equally large doses of essentially identical cultures into six heifers of about one-half the size of the cows used in Dr. Moore's experiment. None of the six heifers aborted. In one, which was killed, the typical exudate of contagious abortion existed in the uterus and gave pure cultures of the *Bacillus abortus*. Many look upon this and similar results

as being in serious conflict. They were not in conflict at all. The five cows in Dr. Moore's experiment were from a herd where abortion had raged the previous year. Two of them had aborted in the previous year, two of them had been sterile or had aborted unseen, and only one had calved, and with her it was not known that she did not have metritis or other definite symptom of contagious abortion. The infection, it might be argued, was present in the uterus at the time of conception from the prior abortion, so that they might very well abort. In the heifers there was no good reason to believe that they were already infected.

Another element entered into the question. The five cows in Dr. Moore's experiment were bred to the herd bull in the badly infected herd. Our six heifers were bred to an experiment bull which had not been previously used for service and which was supposed to be clean. Some veterinarians apparently believe that there was a further conflict in the results obtained. Some would think the results in Dr. Moore's cases proved very clearly that the abortions were the direct result of the infection injected into the jugular vein. We stated that we did not believe that the abortions were due directly to this artificial infection. Even if one asserts that in the five animals experimented upon by Dr. Moore the abortion was due to the injection, and we assert that it was not, the conflict was apparent rather than real. It is a general law of infectious diseases that the damage done by the infection at a given point is more or less dependent upon the degree of general infection. It might very well have been therefore that if the five cows inoculated by Dr. Moore had not received these pure cultures in the jugular they would not have aborted, but that does not at all mean that the abortion was the direct outcome of the intravenous injection. It is perfectly reasonable to assume, and we believe that one must admit, that if the infection of contagious abortion existed in the uterine cavities of these five cows, the addition of a large volume of the *Bacillus abortus* to the blood stream would depress the general system and give free rein to the organism already existing in the uterine cavity, precipitating disaster. Accordingly, many of the apparent conflicts in our data upon contagious abortion are apparent only, and possess no important significance.

Conclusive evidence that cattle abortion can be readily transmitted by co-habitation and that it will rapidly induce abortion in pregnant animals is wanting.

In considering the outlook for the control of contagious abortion in cattle, we must have regard for all the foregoing questions. Many of them cannot at present be answered. None of them can be answered so fully and authentically as we may wish. Enough is known, however, to warrant certain important conclusions which have a bearing upon the question of control.

While admitting that a calf may be born with the infection of contagious abortion in its system, may live and be more or less vigorous and thrifty, according to our investigations, the majority of calves are born free from this infection, but in a large proportion of cases they acquire the infection with the milk. In large herds where abortion becomes static, the infection of the young calves through the milk, as measured by agglutination and complement-fixation, is very severe. In some calves, perhaps far more than we recognize, the abortion infection is so severe that it plays an important part in the mortality of young calves.

When ready to accept this fundamental source of danger, the control of the infection is at hand. We can eliminate a large part of the infection by taking the calf away from the cow at once when expelled and then carefully washing and disinfecting the cow's udder before milk is drawn upon which the calf is to be fed. We may add to this repression of the infection by proper care in the disinfection of the hands of the milker, in the sterilization of the calf's feed pail and in the discarding of the first milk from the teats. We may go further. We may take the milk for each and every calf from a cow which has calved normally and has cleaned promptly. In our investigations recorded in our annual report for 1914-15, we have shown that the tendency of the blood of a cow to react to the agglutination or complement-fixation tests runs parallel to the duration of parturition. If the expulsion of the fetus and fetal membranes requires but two or three hours and no discharge from the genital tract follows, the blood of the cow will not probably react and the blood of the calf fed upon her milk will almost certainly be negative. On the other hand, if the parturition is tardy, and the afterbirth is retained, the blood of the cow will almost certainly react, and if the calf is permitted to take the raw milk, its blood will almost certainly react by the time it is twenty days old.

It appears therefore that we can add increased security for the calf by selecting the cow from which the milk may be taken,

based upon clinical observation upon the duration of parturition.

In our experiment animals and in some other experiments, we have studied the effect of boiled milk. In our own experiment herd, where the degree of infection in most individuals is slight or negative, our calves live well upon boiled milk, and their blood does not react. When we go into other herds, however, and attempt to feed calves upon boiled milk where parturition has been tardy and where the afterbirth has been retained, the calves very largely succumb to disease during the first few days. If, however, such a calf is started upon raw milk, even though it may be suspicious, and the precautions as to cleanliness above suggested are taken, the tendency to infection in the calf is less marked. The calf is more vigorous and healthy, and in time, according to the clinical observations, it tends to throw off and annul the comparatively small amount of infection which it has received. When the calf has reached eight to ten days of age, the infection may be further repressed by feeding the calf upon sterilized milk, which at this age it bears with impunity. There is consequently a seemingly fair prospect for the control of the abortion infection in young calves. It is not as yet practicable to eliminate the infection, but by the proper selection of milk and care in feeding we may keep the infection to a low volume and virility and guard the well-being of the calf.

A second point where efficient repression of contagious abortion may well be hoped for is with reference to animals which have recently suffered from the infection of contagious abortion in the genital tract, producing either sterility, abortion, premature birth, or, these failing, metritis, with or without retained afterbirth. Clinical evidence is now very abundant and clear that in cases which have not been at all pregnant or in which the pregnancy has not been recognized but has terminated in abortion without observation, as well as in those cases where definite disease of the uterus has been clearly observed, we may by thorough disinfection of the uterus, not only tend definitely to favor conception, but, when conception has occurred, tend decidedly to insure the pregnancy against disaster of any kind. This seems to be so thoroughly shown that it should no longer admit of reasonable doubt.

A third opening for efficient repression is with the breeding bull. We have no means at present for eradicating the infection from either sex. As in the female, however, so in the male, we may

accomplish certain results, which seem to favor repression of the losses. We may cleanse and disinfect in a reasonable degree the sheath and prepuce of the bull. In accordance with this, we have for some years recommended the regular douching of the sheaths of breeding bulls. Admittedly it does not reach far enough, it cannot go beyond the sheath and prepuce, but it seems to be valuable, however imperfect. If we really desire that a bull shall be free from the disease, according to the evidence which is now at hand, we must go back to the date of birth and either guard the bull calf against infection or so limit the infection that it will interfere in the least possible degree with his efficiency as a breeding sire when breeding age shall have been reached. This much having been accomplished, we can guard him with some degree of efficiency in so far as having him become contaminated from copulating with diseased cows is concerned. In order to do this, however, we must treat all cows as suspicious, and make our hygienic rules universal in application. We must disinfect the sheath of the bull each time that he is used for breeding purposes.

Our data are reasonably clear upon one other important point. In large herds where abortion is severe and much sterility exists, the bulls are heavily used. A cow which requires ten or fifteen copulations for conception is a greater strain upon the herd bull than ten cows which breed at first service. Owing to the infection which is present in the genital organs of the cow, she not only requires a greater number of services, but each service constitutes a distinct menace to the hygienic condition of the bull. Whenever the work of the bull is greatly increased through repeated copulations, any infection having any venereal character is enormously increased in virulence, according to the general rule applying to venereal diseases. Consequently, if a bull has acquired in a moderate degree the infection of contagious abortion, but not sufficient to constitute any serious menace to his breeding power, the infection may be enormously stimulated and its power for evil indefinitely multiplied by repeated copulation. This danger is further heightened by close confinement and high feeding, which tend constantly to reduce the vigor of the animal and to lessen the resistance to an infection present in his system.

From our viewpoint, believing that the chief sources of infection consists of the milk fed to the newborn calf and of copulation, we consider that the outlook for the control of the disease

is hopeful. The hope for the control of the disease is dependent, however, upon our acceptance of the belief, which is substantiated by so much evidence, that the infection is essentially universal and that the milk of no cow may be safely accepted as being wholly free from contamination with the abortion bacillus. Unless we accept this hypothesis it is vain to expect breeders to go back to the newborn calf to institute measures against future disaster.

This proposal is not without interest in connection with other subjects of very great importance. The ideals which we have suggested for the growing of calves would eliminate other dangers which are of great significance in the problem of cattle growing. There is much agitation throughout our country with reference to the feeding of skim milk and whey from creameries and cheese factories. The agitation has been largely predicated upon the danger from tuberculosis, but the evidence points now so clearly toward raw milk as laying the foundation for great losses in breeding efficiency that it gives the question added importance. When a breeder or dairyman goes to a creamery or cheese factory and carries away with him, to feed his calves, skim milk and whey which have not been sterilized, he carries with him not only great danger from tuberculosis, but he certainly carries, according to the present state of our knowledge, the most virulent infection of contagious abortion which the milk of the neighborhood affords. If the infection in his own herd is not of the highest type of virulence, he then buys in these raw dairy products the most virulent strains of these abortion bacilli which the community affords. In this way the breeder constantly exposes his calves, not to one infection, but to several.

We consider it hopeless to attempt to control abortion and other chronic diseases if the system of the newborn calf is thoroughly saturated with all the various infections which may be transmitted in milk or in other food. If we are to have healthy herds, the foundation for such health is in the growing of healthy calves, and after these have been grown the guarding of their health is a far more simple matter. If we have grown healthy heifers and healthy bulls with which we may mate them, it would appear very hopeful indeed that we may thus have a healthy herd of high breeding efficiency. Attaining this, we might very well close with quarantine regulations by which we would exclude contaminated animals from

entering the clean herd, instead of attempting to control the disease, as has been done for generations, by preventing animals infected with contagious abortion from entering herds also affected with contagious abortion.

It is objected here that it is impolitic to treat the problem openly as a practically universal infection. It is suggested that breeders and dairymen will not accept such a view and that consequently we cannot have measures applied based upon an essentially universal infection, and that hence we can accomplish nothing in its control. The objection is well founded. We do not expect to convince at present any large proportion of breeders or dairymen of the practically universal distribution of the infection of contagious abortion. Veterinarians themselves almost universally teach otherwise, and breeders and dairymen have been taught otherwise for generations. If we look at the other side of the question, however, and attempt to handle contagious abortion as a somewhat rare infection or as being rather common and yet not nearly universal, only a minority of herds really having the infection, the question arises, "How much good will we do?" If we say that where a cow expels a dead fetus at 260 days it is abortion and where, because of a specific metritis, she expels a live fetus at 270 days and it continues to live, it is not abortion, then take the cow which admittedly has aborted out of the herd and leave in the herd the other one which has suffered from the specific metritis caused by the *Bacillus abortus* and has retained her placenta, we certainly shall not control or repress contagious abortion. If a pregnant cow suffers from the specific metritis of contagious abortion, but resists the disease to such an extent that she finally gives birth to a living and apparently healthy calf at full term and retention of the afterbirth accompanies the metritis, there ensues a very great and virulent discharge from the genital tract. The cow has not aborted, and consequently she is not removed from the herd. Surely such a plan cannot control contagious abortion. If we trace the ramifications of the infection throughout, the same general considerations apply. We cannot control the disease by isolation of aborters. It has been tried for several generations, and has failed. It is failing now, and must always fail.

Owing to the general belief that contagious abortion is an acute rather than a chronic infection, various expedients are in-

voked to control the disease, which, being out of harmony with the actual character of the disease, necessarily fail. Believing in the transmission of disease by co-habitation, much has been said regarding the disinfection of the gutter and of the posterior parts of the cow. These may and do have a distinct hygienic value, and should be used, but when we rely upon these for the control or repression of contagious abortion our hopes are upon a false basis.

Others, believing that in some peculiar manner the abortion is due directly to an infection in the blood stream instead of to a local pathologic condition in the uterine cavity, though associated with or dependent upon an infection in the blood stream, have attempted to control the disease by introducing into the blood through one avenue or another various antiseptics. For several generations the use of carbolic acid has been advised, but the fact that carbolic acid is not universally used and that contagious abortion is on the increase is very good evidence that it has not proven highly efficient. More recently, methylene blue has been urged as a panacea. While millions of dollars are being expended annually, the makers of the drug have unquestionably profited as greatly as the users. There is no evidence that the methylene blue enters the sealed utero-chorionic space, where the specific metritis of contagious abortion is exerting its malign influence.

Another group of observers has brought forward the use of vaccines or bacterins with a view to producing immunity. One of the principal reasons why abortion exists so prominently today is that the disease itself does not produce any immunity, and the most definite reason why almost every breeder in the country does not purchase at great expense the abortion bacterins which have been so loudly advertised is that they have failed to produce immunity in this chronic infection. Sometime the production of immunity may succeed.

A new species of fossil horse has been discovered by Dr. Mark Francis of the State College of Texas. The remains were found imbedded in a layer of sand and small gravel at a depth of 25 feet while a well was being dug. In honor of its discoverer the name *Equus francisci* has been applied.—*From the Veterinary Alumni Quarterly, Ohio State University.*

STUDIES ON THE TRANSMISSION AND PREVENTION OF CESTODE INFECTION IN CHICKENS

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INTRODUCTION. The problem of tapeworm infection in chickens has received but little attention in the United States. In fact it was entirely untouched until a few years ago when the subject was opened by Stiles (1896) and work was begun by Ransom (1900, 1902, 1904, 1909) on poultry and other birds. At the present time less than a dozen references constitutes the entire American literature on the subject. Five species of cestodes are known to infest chickens in various parts of the United States.

No work has been done on the life history of the forms existing in this country. However, studies have been carried on extensively with poultry cestodes in various other parts of the world, though as yet very little has been finally determined. In only one species of chicken cestode has the life cycle been demonstrated experimentally. That is *Davainea proglottina* (Davaine) for which Grassi and Rovelli (1889: 372; 1892: 30, 85) have shown that the intermediate host is a slug (*Limax cinereus*). This species of cestode has not as yet been reported in this country.

Chickens are supposed to become infested with another species through eating snails, a third through eating flies, and a fourth through eating earthworms. Piana (1881-1882) found in a snail (*Helix*) two cysticercoids which agree closely with the head of *Davainea tetragona* (Molin). No experiments were performed to demonstrate that the cysticercoid was the larval stage of that species and the only evidence of their connection is the similarity in form. Grassi and Rovelli (1892: 33, 87) found in flies cysticercoids which closely resembled *Choanotaenia infundibuliformis* and base their conclusion of identity on the structural similarity.

Grassi and Rovelli (1889: 372; 1892: 29) found in earthworms (*Allobophora foetida*) cysticercoids which they associated with the scolex of *Dicranotaenia sphenoides*, a chicken cestode not reported in this country. Here again the only evidence for regarding it to be the larval stage of this species is a general structural likeness. In no one of these three forms was the life cycle demonstrated experimentally. Such comparisons are not proof that the cysticercoids are intermediate stages of definite species, but only give a clue as to the probable life cycle.

In other kinds of poultry more has been done on the life histories of their cestodes. The life cycles of five species of duck cestodes have been demonstrated through experiment. Schmidt (1894) proved that *Drepanidotaenia anatina* (Krabbe) has its intermediate stage in a fresh-water crustacean (*Cypris ovata*). He fed large quantities of tapeworm eggs to the crustaceans and found that the larvae developed in two weeks during the summer. Rosseter (1891, 1892) has shown that a second duck cestode, *Echinocotylus Rosseteri* (Blanchard), has its intermediate stage in another small fresh-water crustacean (*Cypris cinereus*). He fed large numbers of the crustaceans to ducks which upon examination later yielded a large crop of tapeworms of the species named.

Rosseter (1897) also demonstrated experimentally the life histories of three other species of duck cestodes. He had discovered some cysticerci in crustaceans which he compared with the adult worms occurring in ducks and found that they agreed closely. He produced *Dicranotaenia coronula* in a duck by feeding it *Cypris cinerea*. *Drepanidotaenia gracilis* was introduced into the ducks through *Cypris cinerea* and *Cypris viriens*. *Drepanidotaenia tenuirostris* was likewise raised by feeding *Cyclops agilis*.

As in other cases the question of control of infection in chickens depends to a great extent upon the life history of the parasites. Little can be done to wipe out the disease until more is known of its source. Certain methods may be employed to check it, but as yet it has been impossible to prove the exact source of infection. Usually it is easiest to control such forms during the developmental stages.

This paper is the result of some investigations carried on to find out the life history of certain chicken tapeworms. Numerous experiments were tried on various insects and many observations made on the habits of the birds in the endeavor to ascertain where the cause of the infection was located. The habits of the birds are probably the chief factors to be dealt with in experiments of this kind. Certain insects that are common about the habitats of the birds are readily eaten. They are hence more likely to be intermediate hosts than those which are rare in these localities. Such factors have been taken into consideration and through experiment it has been shown that one cestode, *Choanotaenia infundibuliformis*, has its intermediate stage in the common house-fly.

The most of the material was collected, and the experimental

work was done on a farm at Hardy, Nebraska. A large amount of material was also collected at the poultry farm at the University of Illinois.

Thanks are due to Professor D. O. Barto, of the University of Illinois, for giving me the privilege of collecting material at the poultry farm. For other assistance I am indebted to my father and mother, William and Flora Gutberlet, for their untiring efforts to make this work a success by taking records and making collections of material at times of the year when they would not otherwise have been taken.

I wish to express my appreciation to Dr. Henry B. Ward, at whose suggestion this work was first taken up, for his helpful suggestions and criticisms during the preparation of this paper.

METHODS OF TECHNIC. In making collections of tapeworms the intestine of the bird was slit open under water and the contents removed by shaking gently. The worms are usually attached to the wall and can be easily seen and removed with the aid of a pair of needles. Those that are not attached sink to the bottom of the dish.

In removing the worms from the intestine it was found best to transfer them directly to fresh water. A weak saline solution was demonstrated to be harmful as the worms die in it in a very short time. Tower (1900: 362) found saline solution harmful to cattle cestodes (*Monezia*). In fresh water, the worms soon become well extended and remain alive and normal for twelve to fifteen hours, or even longer. The worms are best killed in a corrosive-acetic solution and preserved in 70% alcohol and glycerine. For study of structure and accurate diagnosis of species the worms were cut in sections from 5 to 10 microns in thickness, stained in Delafield's or Ehrlich's acid haematoxylin and destained in acid alcohol.

In order to use house-flies for experimental purposes one has to work out first, methods of keeping them alive. The flies used were kept for experiment in small cages. They demanded a great deal of attention because the slightest disturbance of conditions was harmful. They were fed most satisfactorily on blood, liver, and spleen. It was found that a fly could not live long without a constant supply of water in the cages. The cages had also to be placed in the sun for a few minutes each morning, and then kept in the shade for the rest of the day, but not in a cool place.

At the conclusion of the experiment the flies were killed, fixed in corrosive-acetic solution and preserved in 70% alcohol. The chitin covering of the body of the flies was punctured to allow these fluids to penetrate properly.

Large bottles proved very satisfactory as cages for beetles during the experiments. The bottles were fitted with glass or metal stoppers provided with pores for the passage of air. Leaves and a small amount of soil were placed in the bottom of the bottle. The beetles were killed and preserved like the flies, but before sectioning the chitin covering was removed by dissection.

AMOUNT OF INFECTION. The flock of chickens upon which these studies were carried on was so heavily infected with the tapeworm disease during certain seasons that it was rather unusual to find a bird that did not harbor at least a few of the parasites. The investigations extended over a period of two summers. Close observations were made during those seasons, and also at several other times during the year, to secure a record of the amount of infection during other seasons than the summer months.

The first summer (1912) about fifty chickens were examined for parasites. Eight of these were adults and in no case was there any infection. Ten young birds from six weeks to two months old were examined in June, but none of them were infected. The first infection of tapeworms for that year was detected on July 25. Between that date and September 9, thirty-two young birds were examined and every one showed some infection. In some it was slight, while in others it was very heavy. During this same period, between July 25 and September 9, some adult birds were examined but yielded no parasites.

During the summer of 1913 forty birds were examined between August 10 and September 18, with some infection in every bird. A few of these were adult birds which had only a few parasites. The young birds were more heavily infected, although the number of parasites varied with different birds. In one bird which was examined at the age of seven weeks, twenty-five tapeworms were found. Between June 17 and August 1, eight birds were examined and cestodes were present in every bird with the exception of one adult killed on June 24.

I have records of infection in the flock for January 1 and April 27, 1913, and for November 20, December 2, and December 26, 1913. There are five species of worms infesting the chickens in this place and further details are given in the table.

Between June 20 and August 1, 1913, examinations were made of about fifteen birds at Urbana, Ill. Some of these were from the poultry farm at the University of Illinois and others were from private yards of residents in this vicinity; in only one bird was there any trace of an infection. In that case there were a few fragments of worms which were in such a state of disintegration that they could not be preserved or determined. No further examinations for parasites were made in this locality until December 2, 1913, when it was discovered that the chickens at the poultry farm at the University of Illinois were badly infested. Several were examined and found to harbor *Davainea echinobothrida*, *Davainea cesticillus*, and *Hymenolepsis carioeca*.

A general examination was made of the living birds at the poultry farm and it was discovered that symptoms of cestode disease were manifested by the great majority of the chickens, although the infection was apparently not heavy except in a small percentage of the flock.

In making examinations upon dead birds infested with *Davainea echinobothrida* it was found that large nodules were formed in the intestinal wall which is a characteristic pathologic effect of this particular spiny-suckered form. *Davainea cesticillus* seems to be almost universally present as there was hardly an infested bird examined in Nebraska or Illinois that did not harbor some of this species.

The following table shows the amount of infection and the number of worms occurring in each bird examined, both in Nebraska and Illinois:

DATE	LOCALITY	Age of host	No. of <i>D. cesticillus</i>	No. of <i>D. tetragona</i>	No. of <i>D. echinobothrida</i>	No. of <i>Hymenocarioeca</i>	No. of <i>Ch. ichthyophaga</i>
July 25, 1912	Hardy, Neb.	4 mo.	5				
" 29	"	4 mo.	2	8			
August 2	"	5 mo.	3				
" 7	"	5 mo.	3	15		20	2
" 8	"	5 mo.	10	25		10	
" 9	"	5 mo.	10	35			
" 10	"	5 mo.	5	15		5	2
" 11	"	5 mo.	7	10		3	
" 12	"	5 mo.	10	10		30	3
" 15	"	5 mo.	5	4			1
" 20	"	Adult					
" 20	"	5 mo.	3	15		3	1
" 21	"	5 mo.	15	10			
" 21	"	5 mo.	3	2			2
" 22	"	5 mo.	3	8			3

DATE	LOCALITY	Age of host	No. of <i>S. caecalis</i>	No. of <i>S. tetragona</i>	No. of <i>S. echinobothrid</i>	No. of <i>Hymenocarcina</i>	No. of <i>E. lendeniformis</i>
" 23	"	5 mo.	3	3		2	2
" 25	"	5 mo.	5	10		10	
" 27	"	5 mo.	6	4			5
" 29	"	Adult					
September 2	"	Adult					
" 4	"	6 mo.	5	20		10	
" 6	"	6 mo.	15	10			6
" 7	Hardy	6 mo.	10	14			5
" 8	"	6 mo.	4	10			2
" 9	"	6 mo.	10	10		5	
January 2, 1913	"	Adult	3				5
March 23	"	Adult					
" 25	"	Adult					
" 30	"	Adult					
April 27	"	Adult	10				
June 17	"	Adult					
" 24	"	Adult					
" 21	Urbana	2 yr.					
" 23	"	2 yr.					
" 28	"	2 yr.					
July 7, 17, 20	Hardy	4 mo.	infection, but records incomplete.				
August 10	"	4 mo.	5	10			15
" 11	"	4 mo.	3				
" 15	"	4 mo.					3
" 16	"	5 mo.	15	30		20	10
" 17	"	5 mo.	25	30		5	8
" 19	"	5 mo.	6	15			5
" 20	"	5 mo.	6	6			
" 26	"	5 mo.		15	2		
" 26	"	5 mo.	20	25	8		10
" 27	"	5 mo.	1	5	4		
" 28	"	5 mo.	2	10		10	5
" 28	"	5 mo.	10	10			6
" 30	Hardy	5 mo.	8	18			3
September 2	"	Adult	3	12			4
" 4	"	5 mo.	20	20			
" 6	"	7 wks.	17				8
" 10	"	5 mo.	8			10	5
" 10	"	5 mo.	15	25			4
" 11	"	5 mo.	10	15			4
" 12	"	5 mo.	25	35			15
" 13	"	5 mo.	8	10	4		8
" 15	"	6 mo.	10	10			5
" 16	"	6 mo.	3	30			
" 17	"	6 mo.	20	10			
" 20	"	8 mo.	35	6			10
December 2	Urbana	4 mo.	20		30		
" 5	"	4 mo.			3		
" 6	"	Adult	5			5	
" 9	"	6 mo.	6			6	
" 24	Knoxville, Ill	Adult	17	00	00	00	1
" 26	Hardy	Adult	1	11			3
January 1, 1914	"	Adult	3	2			5

SYMPTOMS AND EFFECTS OF TAPEWORM INFECTION. A great deal has been written on the symptoms of this disease by various authors, but in every case they were unable to reach any definite conclusions on the subject. In my own study, which was extensive, I reached the following definite conclusions: The symptoms, while not really individual, vary to some extent with the different birds, with the age of the birds, and with the degree of infection. Some birds are affected by the disease much more than others and show symptoms and effects much more readily. Some birds that show no symptoms and appear in good health are heavily infested with the worms, while others showing severe effects and manifesting all the symptoms are not nearly as heavily infested. The age of the host is a factor of much importance for indicating the presence of an infection with the species I studied. Young, growing birds are affected much more than adults and show the symptoms more distinctly. Even a comparatively slight infection can be detected in a young bird a few weeks of age, while a heavy infection is very marked. Most adults manifest no external symptoms as far as appearance is concerned unless they are heavily infested. The degree of infection is another factor which is of importance in making a diagnosis for cestodes. Birds that harbor only a few worms show conditions which are quite different from those that possess a large number. Therefore the symptoms are rather variable.

Stiles (1896: 13) mentions some general principles for diagnosis, and Zurn (1882: 17) gives more fully some of the symptoms that may be taken as indications of the disease in the birds.

In general, one may say that a light infection can hardly be noticed and is apparently in no way harmful to the fowl. In cases suffering from a moderate to a heavy infection the conditions were found to be quite different. In the first place, birds that are moderately infested are apparently always hungry, having indeed ravenous appetites and seeming never to be able to get enough to eat. Secondly, they manifest a great desire for water, increasing in cases where the infection is heavy. Moreover, infected birds are greedy and it seems as if their hunger had caused them to lose control of themselves whenever there is a chance to obtain any food. Such birds are also restless, always moving about as if searching for something. This in part probably accounts for the fact that the fowls are poor in flesh and more or less in an emaciated con-

dition. They are never at ease on account of their restless attitude which is apparently due to nervousness. Normal exercise alone does not depress the condition of the bird, but rather the constant restlessness and uneasiness which is manifested by those that are infested.

The heavily infested chickens become emaciated and lose their color, the feathers become ruffled, and the plumage is not glossy as in the fowls that are free from the disease. Growing birds that were heavily infested, were found usually to be slender and quite poor in flesh, the head very thin and the comb pale. In cases of heavy infection the growing birds isolate themselves to some extent and often allow the wings to droop and hang at the sides. The sick birds, even though they isolate themselves, still manifest a great desire for food and water.

A slight infection is hardly to be detected in the droppings, but when it is heavy there is developed an irritation or inflammation of the intestinal epithelium, a kind of catarrh which results in a diarrhea, varying with the degree of infection. This irritation of the intestinal epithelium by the worms causes an abundant flow of mucus into the intestine. The mucous secretion is at first a clear, transparent semi-liquid, and sometimes slightly whitish. Worms which are slightly transparent are difficult to see, as they are imbedded in the mucus. Later the mucus takes on a brownish color which is due in part to slight hemorrhages of the epithelium caused by the irritation of the worms. This color of the mucus is retained until it is passed out with the feces so that the droppings of an infested bird have always a characteristic yellowish-brown color. This factor of coloration in the droppings is one that can nearly always be depended upon as a criterion of infection.

When the infection is heavy a gas is formed in the intestine which is noticeable in the droppings in the form of bubbles. These bubbles are present when the feces are first passed and remain in the semi-liquid droppings for some time. This is very characteristic in cases of heavy infection but is not noticeable at other times except in cases of extreme diarrhea, and then the gaseous formation is comparatively slight. In a flock that is heavily infested nearly every dropping detected about roosting or resting places shows the characteristic yellowish-brown color with a large number of small gas bubbles enclosed. The infested birds pass droppings often, though in small quantities.

Segments of the worms can usually be found when there is a moderately heavy infection, and eggs can nearly always be demonstrated by the aid of a microscope, but the latter method is not practical under all circumstances. When the above methods fail to show any signs of infection and an absolute diagnosis is desired it may be well to take a few of the birds that show some of the symptoms, kill them and make an examination of the contents of the intestine between the gizzard and caecum. Any infection which cannot be detected by the above methods is so slight that it is not harmful to the birds in any way, or is so recent that the cestodes are too small to be seen.

The best criteria for diagnosis are the emaciated condition of the birds, the great desire for food and water, and the marked diarrhea with the characteristic yellowish-brown color of the droppings: furthermore in cases of heavy infection segments of worms can usually be detected, though there is some degree of uncertainty in making gross examinations for the proglottids in the feces. The excretions from the kidneys are white in color and at times have somewhat the appearance of the tapeworm proglottids. This may at times be misleading to one who is inexperienced with this method of examination. The excretion from the kidneys can be readily distinguished from proglottids by placing the droppings in water and breaking up the mass. Proglottids have a definite shape and are firm, while the excretions break up into fine granules, or shreds which are easily disintegrated by shaking.

Some of the above symptoms for cestode infection are identical with those for nematodes: the emaciated, unthrifty condition, the ruffled, dull appearance of the feathers, and the more or less restless attitude of the bird. The feces, however, look quite different and often blood is passed with the droppings in cases of nematode infection. The nematodes produce hemorrhages in the intestine by boring into the epithelium.

Tapeworm infection is harmful according to the degree of infection. A slight infection does practically no harm to the bird, but when there is a heavy infection the condition is more serious. The intestinal inflammation or catarrh is quite a serious matter and in many cases may prove fatal. It brings on a more or less anaemic condition and the bird's general health is run down. Such a condition is suitable for the coming in of other diseases, since the fowl is unable to ward them off because of its weakened state

of health. Through these means the tapeworms are most harmful, as their effect works more or less indirectly with other diseases.

I have found instances where the worms were so numerous that they would form such a large compact mass in the intestine as to interfere with passage. These masses imbedded in a great quantity of mucus become lodged at the junction of the small and large intestines with the caeca.

One species, *Davainea echinobothrida*, produces nodules or ulcers in the intestinal wall which are often mistaken for other diseases. This has a more serious effect upon the chickens than some of the other species as it has more of a direct pathological effect.

Chickens infested with any of the species of common tapeworms devoured great quantities of food, but upon examination the intestines were usually found empty. It seems as if the food material after reaching the intestine rushes through rapidly on account of the large amount of mucus and the marked diarrhea. This does not allow the bird to obtain as much nourishment as it would otherwise. The cestodes of course absorb their nourishment from the chyme in the intestine. Furthermore, the excretions from the worms may also have some effect upon the general health of the bird, as some are without doubt resorbed into the system from the intestine.

More practical proof must be obtained by experimental study on the various effects and symptoms of infection in chickens before much can be definitely said on the subject. As yet there is but little known in regard to definite symptoms and effects except in a general way.

METHODS OF CONTROL. The subject of the control and treatment of tapeworm disease in chickens has not been studied extensively. There is need of more experimental data before much can be said concerning it. Several remedies, however, have been tried with some degree of success, although they do not seem practical when large numbers of birds are to be treated.

A practice general among poultry raisers is to isolate a sick bird and leave it to cure itself, or to kill it. Most poultry men do not take the trouble to treat a sick bird nor do they even try to find out the cause of its ailment, but simply say that it has "gone light." Such an expression covers a multitude of diseases prevalent among poultry. Birds that are heavily infested with worms

isolate themselves and become emaciated. They are also said to have "gone light."

As the first prerequisite for carrying on any sort of treatment for worm diseases, the infected birds must be isolated from the rest of the flock so that the latter can be kept free from contamination. The droppings from the sick birds must be cared for or destroyed in some way so that the embryos of the worms are killed and insects prevented from feeding on them. In general for any flock, preventive measures should be taken against infection of all kinds by keeping the surroundings clean and sanitary; all droppings around roosts should be collected often or subjected to such treatment as will render them harmless or inaccessible to insects. Wherever an infection is present, even if only slight, such preventive measures should be taken to eliminate all possibility of its further increase. One of the best is to collect the droppings about the coop daily and place them into vats or cans that are inaccessible to insects or worms; they are then treated with lime or some substance which destroys the embryos. Lime or ashes should be scattered over the droppings around the roosts and the resting places of the birds. This destroys the embryos and keeps insects from feeding upon the droppings. Furthermore, if the droppings are covered with lime and collected often it will prevent insects from breeding in them. House-flies especially, lay eggs in chicken manure if the droppings are not treated with lime.

Other features in the habitat of the birds should be kept sanitary; such are the feeding places and drinking vessels. Watering troughs should be so placed that the birds cannot get their feet into them, as they may carry in eggs or embryos of other parasitic worms (nematodes) which will reach the birds again through the water if the latter is allowed to stand in a filthy condition.

The location of poultry yards should be changed from time to time if possible, because if the same grounds are used from year to year some of the insects that may be the intermediate hosts of the tapeworms may become numerous and thus increase the possibility of infection. Embryos of parasites or germs of certain diseases remain on the premises from year to year, and if the yards are changed, more healthful conditions are produced for the birds.

In addition to destroying the eggs and embryos of parasites in the droppings, it is fully as important to destroy the adult insects and their breeding places. The life history of only one spe-

cies of tapeworm has been worked out in the United States, as is discussed elsewhere in this paper. This species is known to have its intermediate stage in the house-fly. House-flies breed commonly in bird or horse manure, or any decaying vegetable matter. The destruction of all such breeding places is a difficult matter and little can be done along that line or with the destruction of adult flies. However, fly traps* can be placed over the windows of the chicken coop and many flies caught and killed.

According to Stiles (1896:18), the principal remedies that have been used for the removal of tapeworms from poultry are such drugs as extract of male fern, turpentine, powdered kamala, areca nut, pomegranate root bark, pumpkin seeds, and sulphate of copper. These have been experimented with to a certain extent and have been found to be satisfactory in some instances.

The experiments with these remedies have been worked out on individual birds. Each bird must be treated individually. While such methods of treatment are thorough, they are not practical for a poultry raiser who has an infection in a flock of several hundred birds. It would require handling each bird separately two or three times, and demand a considerable amount of time; too much to be practicable on account of the expense involved.

I tried experiments on a number of birds to see whether a more practical method could be found. It had been observed previously that hogs infected with worms could be freed from them by feeding the ashes from corncobs. The ashes contain a large amount of sodium and potassium carbonate. Lye is made from ashes and of course contains similar substances, together with sodium hydroxide.

The following experiment worked very successfully: Fifteen birds which showed symptoms of tapeworm infection were placed in a cage which was insect-proof and were given the following treatment; A gallon of a mixture of wheat and oats, to which was added a small tablespoonful of concentrated lye, was cooked slowly for about two hours and allowed to cool. The birds were fasted for about fifteen hours and were then given as much of the mixture as they would eat, with plenty of water. Twelve hours later one of the birds was killed and an examination of the small intestine was made. It was found that nearly all of the worms in

*Such as described by F. C. Bishopp, Farmers' Bulletin No. 540, 1913.

the intestine were loose, the scolices being detached from the wall, and were also apparently dead. The rest of the birds were given a second dose twenty-four hours after the first. Many worms had passed with the droppings in from twenty-four to twenty-six hours after the first feeding. Most of the worms in these droppings were dead, but in all probability the embryos were still alive in the mature proglottids. Twelve hours after the second dose was given another bird was killed and it was found that only a few worms were left and all of these were detached and dead. The intestine was filled with a peculiar gray colored, slimy substance composed mainly of mucus. Many entire worms and fragments were passed with the droppings during the period of the feeding. The lye acted to some extent as a purgative.

The birds were given normal diet again, and in a few days they showed no symptoms of infection. Eight days after the second dose two more birds were killed and examinations made. One possessed a small fragment of a tapeworm and the other was entirely free.

The effects of such treatment upon the flock as a whole were shown later. While I was carrying on other investigations with chicken cestodes my father noticed that the birds were very heavily infested with worms. In an endeavor to free the birds of the worms and to improve their general condition he fed them a mixture of cooked grain and lye on July 15, unknown to me. As a result the entire flock of nearly four hundred birds was practically freed from the worms by a single application of the remedy. The cestodes were so thoroughly removed that there were not enough left to allow me to go on with my investigations and my observations on the worms were not taken up again until August 10, when the birds had become infested again and the parasites had grown to such size as to enable the continuance of my work.

This remedy is a very simple one and is practical. It has been known to many poultry raisers for some time, but they have neglected to use it, mainly on account of the fact that heretofore no definite evidence has ever been presented concerning its actual working possibilities. It may not, and in all probability will not, remove all the worms, but it does remove most of them so that they are not serious and can be controlled in the flock as a whole.

In a large flock the birds can be housed for the length of time required for the fast, then fed on the cooked grain and kept

in the house until after the effects of the second dose have passed off. During the time that they are confined the droppings should be collected often and lots of lime used about the coop and over the droppings to keep away the insects. In a flock the treatment would have to be repeated from time to time whenever the birds became infected again. Further experimental evidence must be obtained before much can be said in regard to details of this method of treatment, especially as to the amount of the alkali to be used. A large amount would be harmful to the intestinal mucosa, while a small amount would have little if any effect upon the parasites.

FEEDING EXPERIMENTS FOR INFECTION. Chickens in the vicinity of Hardy, Nebraska, were heavily infested with tapeworms, and young birds were found to be more heavily infested than the adults. This led to investigations concerning the reason for the difference in the infestation of the adult and young birds when they were together in the same environment and fed on the same diet.

The summer of 1913 was very dry in the locality which was a factor in keeping the numerous varieties of insects down to a minimum, because the drought interfered with their breeding. Upon observation it was found that only two kinds of insects were present in any abundance about the haunts of the birds. Those were the ground beetle *Tenebrio* and flies. The stable fly, *Stomoxys calcitrans*, which usually breeds in wet, decaying straw, was very scarce because its breeding places had dried up. The house flies were very abundant everywhere.

The reason why the adults should be only slightly infested with parasites, while the young and growing birds harbored so many, was then the subject for observation. The birds were watched in their haunts and their habits studied. It was soon noticed that the young birds, when in their resting places in the shade of a tree or a building, were busy the whole time pursuing flies and very often caught their prey, while the adults paid little or no attention to the flies. This led to the conclusion that flies might have something to do with the transmission of the worms to the birds.

With a view to testing this hypothesis, experiments were carried on with the worms that were most common in the birds. These species were *Davainea cesticillus*, *Davainea tetragona*, and *Choanotaenia infundibuliformis*.

Segments of these worms were teased apart so that the eggs or embryos were set free in a drop of water, and this was fed to flies

of the species: *Musca domestica*, *Stomoxys calcitrans*, and *Calliphora vomitoria*.

Only a few *Calliphora* could be obtained and these did not live long under experimental conditions. This species of fly does not frequent places where it would be likely to become the intermediate host of any of the chicken cestodes, as it always remains in cool, damp, and usually dark places, unless it can find carrion. However, on cool, dark, damp days it does appear in chicken yards, but its occurrence there is not frequent. Some *Stomoxys* were used, but in no case did they live long in captivity.

Musca domestica lived much longer than either of the others, even though it was difficult to keep them alive for a long period. After a great deal of experimentation it was found that they could be kept alive in a cage for twelve or thirteen days, and in one extreme case some were kept alive for twenty-one days. The flies in captivity were fed on blood, liver and spleen. These were found to be the best foods.

The oldest proglottids on the worm were usually taken for feeding to flies, and also some of the free segments in the intestine were used. The use of the oldest proglottids proved to be an error in the case of *Choanotaenia infundibuliformis*, because it was found later that in this species the oldest segments separate from the worm before they are entirely mature, but proglottids that have been free in the intestine for some time may be mature. The use of proglottids that were not entirely mature for feeding flies was an error in my experiments which may account for so few infections.

DAVAINEA CESTICILLUS. In a series of experiments 107 flies of the species *Musca domestica* were fed on the eggs from proglottids of *Davainea cesticillus*. Some were killed and preserved each day from the beginning of the experiment until the tenth day, when the remaining flies died, except in one case four were kept alive for twenty-one days. These were all sectioned with the exception of five, which were dissected. No stages of the cestodes were found in any of the flies when examined.

During the experiment microscopic examinations were made of a great number of the droppings of the flies and no eggs or embryos of the worms could be found in any case. It is certain that the flies got some of the eggs because they were numerous in the material that was fed to them. The flies would lap up all the water in which the eggs floated and would then suck on the fragments of

proglottids. In several instances when the flies were hungry it was observed that they would take small fragments of the proglottids between the labella of the labium and actually devour them. Since the eggs are microscopic in size it is practically certain that the flies got some of them.

Several *Calliphora* were fed on eggs from this species, but these flies lived for only two or three days.

Proglottids of this tapeworm were fed to a number of beetles of the species *Tenebrio molitor*. The beetles ate the segments readily. Some were killed at the end of one week, others at two weeks, and the rest at three weeks. These beetles were sectioned, but showed no developmental stage of cestodes.

DAVAINEA TETRAGONA. In experiments on this species 59 flies in all were used. Some of these were killed and preserved after from two to twelve days. The proglottids were broken up and the eggs set free in a drop of water. The flies lapped up the water with the eggs and afterwards sucked all of the moisture from the fragments of the proglottids. Therefore, it is very probable that the flies got some of the eggs. Microscopic examinations of the droppings of the flies showed no signs of eggs.

Material would pass through the flies in a few hours as was demonstrated by feeding them on blood. When the flies gorged themselves with blood they passed red droppings in from eight to ten or twelve hours. This indicated the length of time that it took material to pass through the alimentary canal. In this way the approximate time to make fecal examinations for the eggs was determined. However, examinations were made of the droppings after five or six hours as well as later and at regular intervals of two or three hours.

The flies were fed on eggs once or twice each day for three days. When they were fed once a day that was done in the morning, and when fed twice they were given one dose in the morning and the other at noon. On three occasions some flies were fed in the evening and fecal examinations were made the next morning and continued at intervals of two or three hours.

The flies were all sectioned and examined, but showed no stages of the cestodes in any instance.

Some *Calliphora* were fed upon the eggs of this species, but they did not live more than two or three days. Some beetles, *Tenebrio*, were fed on proglottids, but upon examination they showed nothing.

- ✓ CHOANOTAENIA INFUNDIBULIFORMIS. Eggs of this species were fed to 88 flies of the species *Musca domestica*. Besides these some *Stomoxys calcitrans* were also fed, but these did not live long in captivity. The individuals of *Musca domestica* used in these experiments lived from two to seventeen days. Two flies lived for twelve days and four for seventeen days. The proglottids were broken up and fed to the flies in the same manner as in the other species mentioned. All of these flies were sectioned and examined.
- ✓ One fly preserved at the end of twelve days showed five cysticerci. These cysticerci agree very closely with the structure of the adult of this species, and the hooks are identical. This cysticercus is described in detail in another paper.
- ✓ Grassi and Rovelli (1892: 33) found cysticerci in flies which they compared with this species. They found that there was a close agreement in structure between the cysticerci they discovered and the adult of *Choanotaenia infundibuliformis*. They therefore inferred that the larva they had was the intermediate stage of this species, but did not demonstrate experimentally its connection with the adult tapeworm.

During the process of my experiments I had hoped to be able to feed some chicks on flies that had been previously fed on tapeworm eggs, but as it was so difficult to keep the flies alive under experimental conditions such an experiment could not be carried out. However, another feeding experiment was tried with the following results: Six chicks were taken from the nest as soon as they were hatched and placed in a cage where they could get no insects and great care was taken during feeding so that no flies could enter. Flies (*Musca domestica*) were caught around the chicken roosts and fed to three of the chicks. The other three birds were used as a control and were given no flies. Fifty flies were fed to each of the three chicks. Three weeks after feeding, the chicks were killed and examined with the result that two were found to be infested with *Choanotaenia infundibuliformis*. One bird possessed six worms. These were of the same length, being 35 mm. long, and each one contained 103 proglottids. The other bird had one worm of the same species, but it was a little longer, 43 mm. and having 118 proglottids. This bird was fed on the flies three days before the one sheltering the six worms. The three birds which were used as a check on the experiments contained no worms when killed and examined.

These six birds were kept together in a cage and were fed on corn meal and bread crumbs. The three birds that were fed flies were caught and the insects were given to them from the hand.

A number of stable flies (*Stomoxys calcitrans*) were used in the experiments with this species of worm, but they would not live under experimental conditions for any length of time. They would usually die within 24 to 36 hours, except in one case when six lived for five days. They were sectioned, but nothing could be found.

On numerous occasions I have observed maggots in the droppings beneath the chicken roosts. Now, since house-flies are in the habit of breeding in such places, it seemed possible that infection might take place in the maggot stage of the flies. Experiments were then tried with the maggots of *Musca domestica* and *Stomoxys calcitrans*. Thirty *Musca domestica* maggots were fed on segments of three species of cestodes, *Davainea cesticillus*, *Davainea tetragona*, and *Choanotaenia infundibuliformis*. The maggots developed puparia in a day or two. Some were sectioned in the pupa stage. The rest developed into adults and were sectioned, a few were dissected, but only negative results were obtained. Fifty maggots of *Stomoxys calcitrans* were fed on proglottids of the same three species of tapeworms. The maggots went into the pupal stage within two or three days. Some were sectioned in the pupal stage. Most of them developed into adults and were sectioned while a few were dissected. No positive results were obtained from either pupal or adult stages.

From the foregoing it seems probable that flies are not the intermediate hosts for *Davainea cesticillus* and *Davainea tetragona*, as the experiments that I have carried on with them are extensive enough to appear conclusive. However, the small number of varieties of insects present in the locality seems to throw the burden upon the flies, since they were so abundant and observations show that they are taken and eaten by the chickens that are most heavily infested. The adult birds eat all other insects that are easy to catch, but since the flies are more difficult to take as prey they leave them alone. If the infection is direct, the adults would have fully as much chance as the young birds because they get food and water together and have the same environment.

In the case of *Choanotaenia infundibuliformis* it seems to be clear that the house-fly is the intermediate host. Grassi and Rovelli hold that it is the intermediate host on a purely structural basis. My experiments show that it is certainly an intermediate

host in some cases. Furthermore, feeding chicks on flies that were taken from about the chicken roosts and raising the cestodes make it probable that the house-flies are the intermediate hosts of this one species.

The reason why more flies were not infected by feeding on the eggs of this species was determined to be peculiar conditions in the maturing of the proglottid. At the time when the experiments were being carried on it was not known that the oldest proglottids separated from the worm before they are entirely mature. In the experiments the oldest proglottids on the worm were usually taken for feeding, though in some cases the free segments in the intestine were used. Since the flies were fed on eggs that were not entirely mature the embryos were digested. The free proglottids remain in the intestine of the bird for some time and in all probability mature there. Some such free proglottids were examined and found to contain mature embryos.

SUMMARY

1. The results of these experiments show that the intermediate (cysticeroid) stage of *Choanotaenia infundibuliformis* occurs in the common house-fly *Musca domestica*. The results were obtained by feeding flies on eggs of the tapeworm and raising cysticeroids in a fly; also by feeding chicks on flies and raising the worms in the birds. By morphological comparison of the cysticeroid and adult they are shown to be identical. Results from experiments by feeding flies on eggs from *Davainea cesticillus* and *Davainea tetragona* were negative.

2. The habits of the birds are important factors to be considered in experimental work for life history studies. Certain insects are found in great numbers around chicken houses and yards and are readily eaten by the birds. Flies are known to contain the larval stage of one species of cestode, and some other species of insects are to be considered as probable intermediate hosts for other species of cestodes.

3. The symptoms and effects of the infection from tapeworms vary with individual birds, age of birds, and the degree of infection. Birds infested with worms display an emaciated, unthrifty condition, an unnatural desire for food and water, and a marked diarrhea with droppings of a characteristic yellowish-brown color.

4. The control of tapeworm disease in chickens is in an unsettled condition. Little can be done until more is known concerning life histories of worms. Preventive measures are urged rather

than curative measures. Droppings should be cared for and treated with appropriate substances in order to prevent insects from feeding on them or developing in them. Experiments by giving lye with food to infested chickens showed satisfactory results in removing tapeworms.

5. The flocks of chickens that were studied showed at times a very heavy infection and nearly every bird examined harbored one or more species of worms. Five species were found in the chickens at Hardy, Nebraska, and three in the birds at the poultry farm at the University of Illinois. The species found in Nebraska are *Davainea cesticillus* (Molin), *Davainea tetragona* (Molin), *Davainea echinobothrida* (Megnin), *Hymenolepis carioca* (Magalhaes), and *Choanotaenia infundibuliformis* (Goeze). At the poultry farm of the University the species *Davainea cesticillus* (Molin), *Davainea echinobothrida* (Megnin) and *Hymenolepis carioca* (Magalhaes) were found.

6. A full description of the structure of these parasites has been published in the Transactions of The American Microscopical Society, Vol. 35, p. 23-44, Pl. 5-8.

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PARALYSIS OF PIGS

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Paralysis of pigs is a disease not uncommon in Iowa and causing quite considerable losses. It has been reported for more than ten years, but seems to have become more frequent in later years, especially now, when we get questions about it from all over the state. It may be said here, that many cases of lameness or rachitis, etc., are mistaken for paralysis, diseases which will not be discussed here, except for the purposes of differential diagnosis.

So far as our experience goes only young pigs (under six months) are paralyzed in the true sense; in no case was a single paralyzed pig found in a herd, but always several, and in most cases all belonged to the same litter.

The histories of the cases are always the same and as follows:

Several young pigs "go gradually down in the hind legs", first staggering as if weak and afterwards being unable to move the hind legs at all. No other symptoms besides these are apparent; especially the appetite is quite normal. After various periods of time ranging from a few weeks to several months, the pigs abstain from food and die. Yet some cases are reported where the lameness or paralysis partly or wholly disappeared. We never had pigs under observation from the start and cannot make any definite statement about that, but we never saw a pig improve. A few cases did not get worse, but did not improve, nor did they gain even in weight.

We generally secured our experiment pigs after they were quite seriously affected, kept them for different lengths of time under observation, killed them and made post-mortem examinations.

The clinical symptoms are totally confined to a motor paralysis of the hind, and sometimes of the front legs. Appetite especially, as mentioned before, is normal, even in pigs, which are not able to change their positions. There is no depravity of appetite, nor exceeding thirst. Temperature charts through 4-5 weeks of observation do not show any deviation worth mentioning. Blood counts and haemoglobin tests proved in three cases to be normal. After four weeks of observation, it becomes apparent that the growth of the diseased pigs is slower than that of normal ones. Yet I believe

that the paralysis alone which confines the pig so nearly to continuous rest accounts for that, and that no other organic disorder must be taken into consideration. Very often complications in form of decubitus set in and threaten the life of the animal. We never had any other complications here, but we frequently had reports, that the pigs desisted from eating a week before they died and became emaciated. I was not able to find any other explanation for that except decubitus and consequently septicemia, but it is of course possible that nerves which are vital are affected in the same way as the motor nerves of the legs. To return to the cardinal symptom, the paralysis, as said before, is a motor paralysis. The degrees of paralysis vary from a condition of slight staggering (Parakinesis) to practical impossibility of movement (Akinesis). Sensibility is always preserved, even in the worst cases and the tendon reflexes are normal. The least noticeable symptom of the beginning paralysis seems to be a certain stiffness in gait. The animals do not lift their hind legs from the ground and consequently often knuckle over. Tottering in the hind quarters, which is very conspicuous, is without doubt due to the inexact placing of the feet. Later on the movements become more and more hampered by the inability to lift the legs forward, and finally the legs are dragged behind, the pig sliding on the haunch of one side. Sometimes the front legs are affected. The same stiffness of gait is here the first symptom, then knuckling over, later walking on the carpus and finally complete paralysis, which compels the pig to lie on one side. We had three pigs, which became completely paralyzed in the front legs, so that they had to be fed by hand. The only free movements left concerned the muscles of head and spine. Even in these extreme cases the appetite was nearly undiminished and digestion, peristalsis, etc., unharmed. A conspicuous feature is the stiffness of the paralyzed muscles, which develops after several weeks of complete paralysis, and which is especially noticeable if passive movements are made, even after death. It is most likely due to the enforced rest of these muscles. Defecation and urination were always normal in the observed cases.

Macroscopical post-mortem examinations reveal nothing of importance. Especially the internal organs, the spinal cord, the nerves, etc., appear to be quite normal. There never were any inflammations of the dura or pia mater, or of the nerve sheaths. Careful examinations of bones were made, as we had reason to believe

that the disease in question is related to rachitis, but without result. Bone breaking tests revealed the strength of femur and tibia to be normal. The coxo-femoral joint sometimes was partly filled with blood and the ligamentum teres swollen on its proximal insertion. This condition proved to be quite acute in microscopic sections, and it was later found in normal pigs also, whose legs had been roughly handled before killing. The complications as decubitus and septicemia, found in late cases, have, of course, no bearing on the investigation proper.

Microscopical investigations and methods on the other hand are very satisfactory. The easiest way to demonstrate the most prominent histological change is to take a small piece of the sciatic or the axillaris nerve,—if the front legs are paralyzed too,—fix it in 10% formalin solution for a few hours, and treat it with 1% osmic acid. The nerve is then washed in running water, passed through alcohol and teased in oil of cloves. The immediate inspection shows a different proportion of the nerve fibres degenerated, viz., the myelin is often shrunk to different sized lumps, between which often are empty spaces; sometimes only the neurilemma is left, the axis cylinder and the myelin sheath having disappeared entirely. The number of diseased nerve fibres in a preparation varies according to the part of the nerve which is inspected, and to the number of motor fibres present. Not only the sciatic and axillary nerves, but the smaller ones of the front and hind legs also contain degenerated fibres.

More elaborate studies of these conditions were carried on employing the Weigert-Pal and Marchi methods. The latter one deserves to be preferred, as the W. P. method shows only the lack of myelin sheaths but not the degeneration in progress. Preparations made after Marchi not only revealed the existing atrophy, but also the fibres in various states of degeneration. The attached plates show everything so distinctly, that detailed descriptions are unnecessary. I only want to say, that signs of perineural inflammation never were observed, even light cellular infiltrations were entirely absent. The appearance of a degenerated nerve fibre in the longitudinal section of a Marchi preparation is the same as if treated after the above mentioned osmic acid method, so a special illustration of the latter is omitted. The Marchi method shows the normal myelin sheaths, the Ranvier nodes and the Schmidt-Lantermann segments much more plainly. Instead of the degenerated

nerve fibres, connective tissue is formed; the myelin detritus is apparently resorbed in a short time. There are different degrees in the extension of the atrophy, but I never saw a fasciculus totally depleted of normal fibres. In the average and generally, half of the fibres are destroyed, but, of course, any condition can be observed. In clinically bad cases, the greatest number of fasciculi are found to be attacked. All this applies to the nerves of the front legs as well as to the nerves of the hind legs.

In the course of this investigation, it was necessary to make normal preparations as checks, especially since the appearance of the spinal cord treated with the Marchi method was quite questionable. Many black conglomerations, similar to myelin detritus were found, and it was not until I found the same phenomena in the normal tissue, that I read Cassirer's paper on "Traberkrankheit", ("Trembles in Sheep"), where he reports similar findings in normal cords of sheep. These black bodies are of uniform size, and distributed nearly equally through the white matter. Weigert-Pal stained sections of the spinal cord are quite normal and correspond to the normal check preparations, especially there are no degeneration areas. The Nissl stain does not show any abnormality in the chromatin bodies of the ganglion cells.

There is one disease reported in the literature of medical investigation, which is rather similar to the disease in question. It is the above mentioned "Traberkrankheit der Schafe" (Tremblente, French; Trembles, Engl.). Investigations of this malady of sheep have been made by Besnoit and Morel, and Cassirer. The clinical symptoms are as follows, citing Hutyra and Marek:

In the early stages excitability, trembling, spasmodic muscle contractions. Then motor disturbances develop, the gait becomes uncertain and peculiar trotting like movements are seen. Owing to the weakness of the quarters the animal cannot move quickly, much less jump over mounds or ditches. In the later stages the fore limbs become weak, the animals stumble along, keep falling down, rising being accomplished with great difficulty. Defecation and urination are normal up to the end; according to Cassirer the reflexes and sensibility to electrical stimuli are normal.

In the majority of cases pruritus at the root of the tail, of the gluteal region, later on of the hind and fore legs is present. The animals rub and gnaw those parts violently. The appetite remains good up to the end, yet anaemia and emaciation become more and

more apparent, finally the weakness of the hind quarters becomes so great, that the animals lie on the ground as if paralyzed, and die from complete exhaustion. The course of the disease takes two to four months. Recovery is very exceptional and occurs only in the early stages of the disease.

Besnoit and Morel, who made histological examinations, report to have found in the ganglion cells of the spinal cord a "désagregation plus ou moins marquée de la substance chromatique." but only a few cells are changed. In the small peripheral nerves they describe a parenchymatous degeneration, identical with my findings. "Dans les tubes malades, le cylindre axe a disparu, la myéline est réduit en boules." "Dans d'autres tubes, les lésions sont plus intenses encore; la myéline, les noyaux, le protoplasma ont disparu; sur une étendue plus ou moins considérable l'élément nerveux se trouve réduit à la gaine de Schwann."

First they did not find lesions in the large nerve trunks, but in a postscript they state that similar changes can be found in the large nerves, if the disease was in the last stage. Their attached microphotographs show the diseased nerve fibres quite similar to my own preparations.

Cassirer on the other hand was not able to find any anatomical changes in the examined tissues, in spite of diligent methods. He conceives the disease as a chronic progressive neurosis and compares it with the pseudo-sclerosis in man. In spite of this, Hutyra and Marek are inclined to see in it a polyneuritis. A further investigation is necessary to clear up this question, but still there is no doubt that the disease described by Besnoit and Morel has many points in common with the paralysis of pigs and justifies a close comparison, regarding etiology and prophylaxis.

It is rather certain that the paralysis of pigs is not infectious. Experiments to produce the disease by intravenous blood injections, by intra-muscular injections of ground nerve tissue near the nerve, and by contact have been so far unsuccessful. Furthermore, reports which came in, show that there is, at least some times, an inherited predisposition in the diseased animals. In one herd of 30 pigs, consisting of 17 Chester Whites and 13 Durocs, only the latter contracted the disease. In other cases several owners were able to trace the outbreak to one boar. So far only outbreaks in Poland China and Duroc Jersey herds are known to us. I give a few numbers (—of herds investigated—) to show the general conditions of an outbreak:

Breed	No. of Young pigs	No. of dis- eased pigs	No. of pigs killed	No. of pigs which died	No. still sick	No. pigs recovered
1 Duroc	58	5	3	—	2	—
2 Duroc*	80	5	4	1	—	—
3 Pol. China	21	7**	2	5	—	—
4 Duroc	75	3	3	—	—	—
5 Pol. China	150	15	5	7 or 8	—	2-3

*No histological examination made.

**One litter.

The etiology of the trotting disease in sheep is not known. Infection, food intoxication, hereditary tendency and disposition by inbreeding are named as causes. Nothing has been proven yet, but since the best prophylactic measures are rational breeding, and elimination of diseased animals from the breeding stock, it seems to me that the hereditary tendency should be considered as the most important cause. There are cases reported where the change of the pasture, viz:—from a wet one to a higher and dryer one, stopped the outbreak and as the last year here in Iowa was a particularly wet one and as in the same time the paralysis of pigs spread quite noticeably, emphasis should be laid on having dry quarters for the animals. Still the chief measure to prevent spread of the disease would be careful elimination of all diseased animals from breeding, possibly even of the parents, viz:—when succeeding litters of one sow are diseased, or many of the off-spring from one boar. Food intoxication and infection can be safely disregarded in our case.

The differential diagnosis of the disease may have difficulties, if only one pig or two are "lame." We had several cases, where the symptoms were quite similar to paralysis, but where we found rachitis inflammations of the femur epiphysis and in one case separation of the caput femoris on both sides. These latter cases were caused by the exclusive feeding of linseed meal, and should have been diagnosed properly by careful examination. Rachitis is of chief importance in the differential diagnosis, but there is, of course, no paralysis and the gait is variously abnormal due to the deformities and sensitiveness of the bones. In nearly all the cases there are other evident rachitical symptoms, which can hardly be overlooked. There are still the cases of combined paralysis and rachitis—cases we had,—where only the course of the disease or an histological examination is deciding.

Sows often are paralyzed after parturition, but I doubt if the same polyneuritis will be found here as in the young pigs. I exam-

ined one case, without finding anything, and another case recovered under observation. Among cows a similar disease is quite frequent: "Paralysis after parturition", and I rather believe that the same condition occurs in sows. In some cases, it may be only exhaustion and weakness due to the lactation period.

To resume, there is an endemic disease among pigs, generally called "Paralysis", which proved to be a "Polyneuritis parenchymatosa." Because of the course and the nature of the disease, therapeutic measures are not advised, but prophylactically the elimination from breeding of all animals, whose offspring repeatedly incline to the disease, and of all diseased animals, even when recovered, and the eventual change to dry quarters and proper food will most likely be successful.

(I wish to thank Dr. Chas. Murray for his help in securing the material and making the post mortems.)

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2. BESNOIT ET MOREL: Note sur les lésions de la tremblante du mouton. *Rev. Vet.* 1896, p. 397.
3. CASSIRER: *Virchows Archiv*, 1898, CLIII, I.

EXPLANATION OF THE PLATES

No. 1. Pig with motor paralysis of the hind legs.

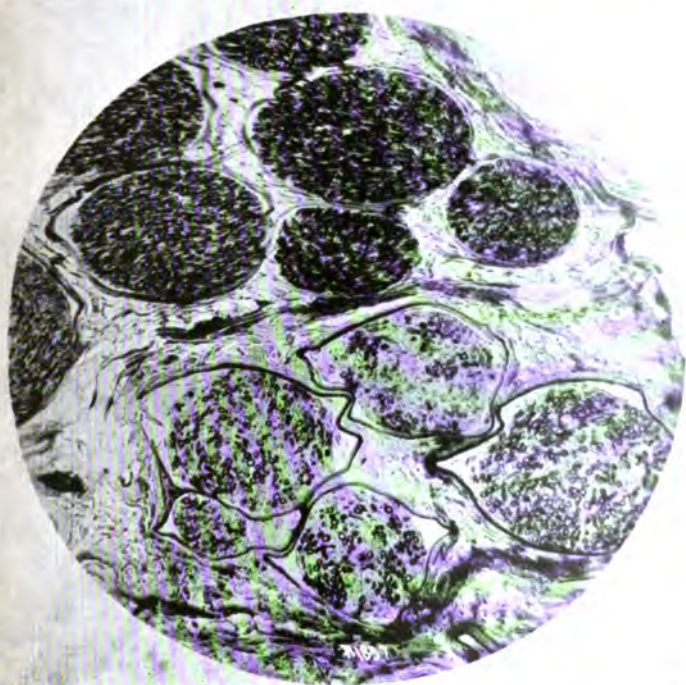
No. 2. Cross section through the sciatic nerve of a paralyzed pig. Stained after Weigert-Pal. The five fasciculi in the lower half of the picture show degeneration of nerve fibres.

No. 3. Same as in No. 2. Stained after Marchi.

- a. Fasciculi, whose nerve fibres are partly degenerated.
- b. Nerve fibres in fatty degeneration.
- c. Fat.

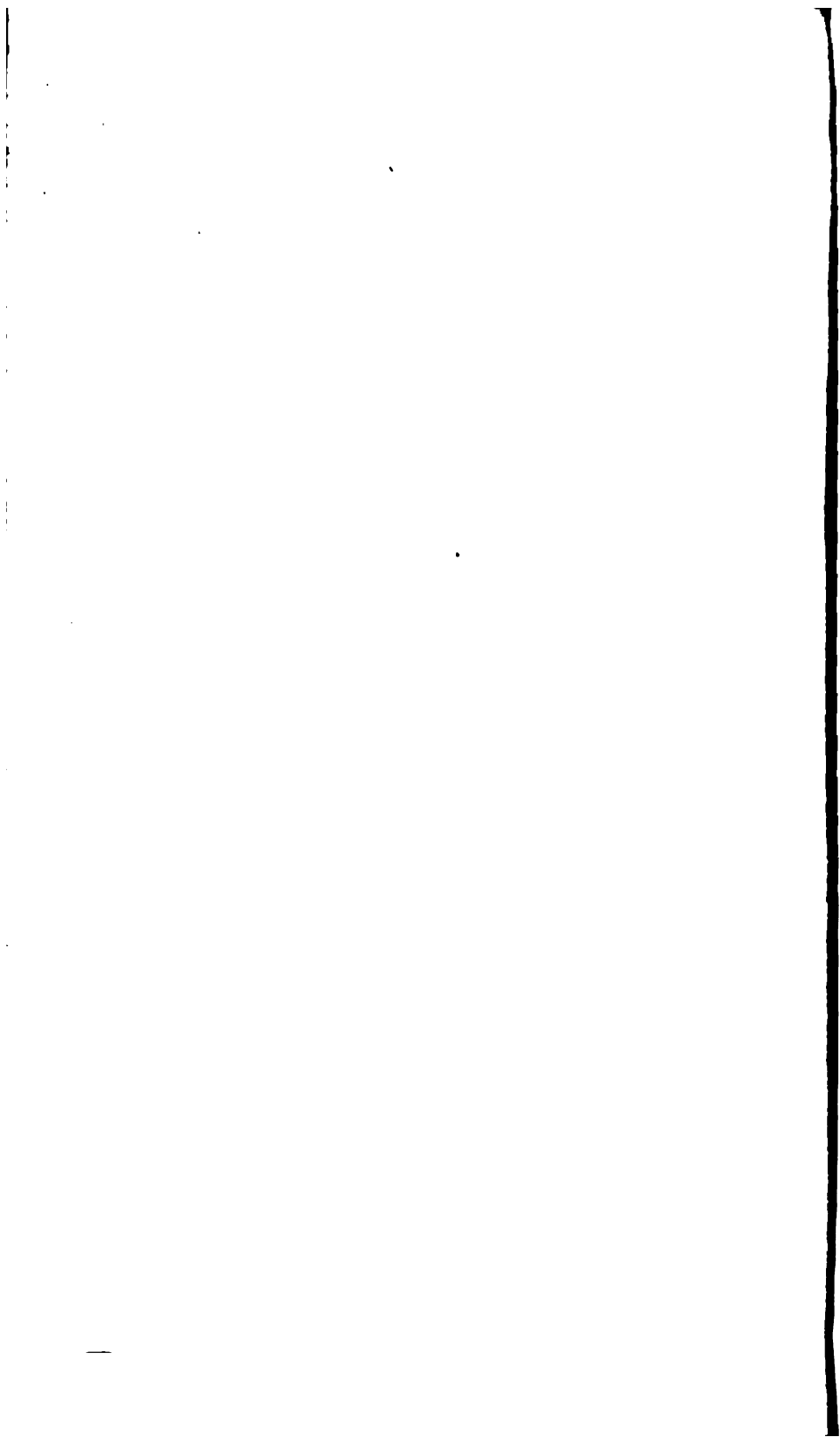
No. 4. Longitudinal section through sciatic nerve, stained after Marchi. High power.

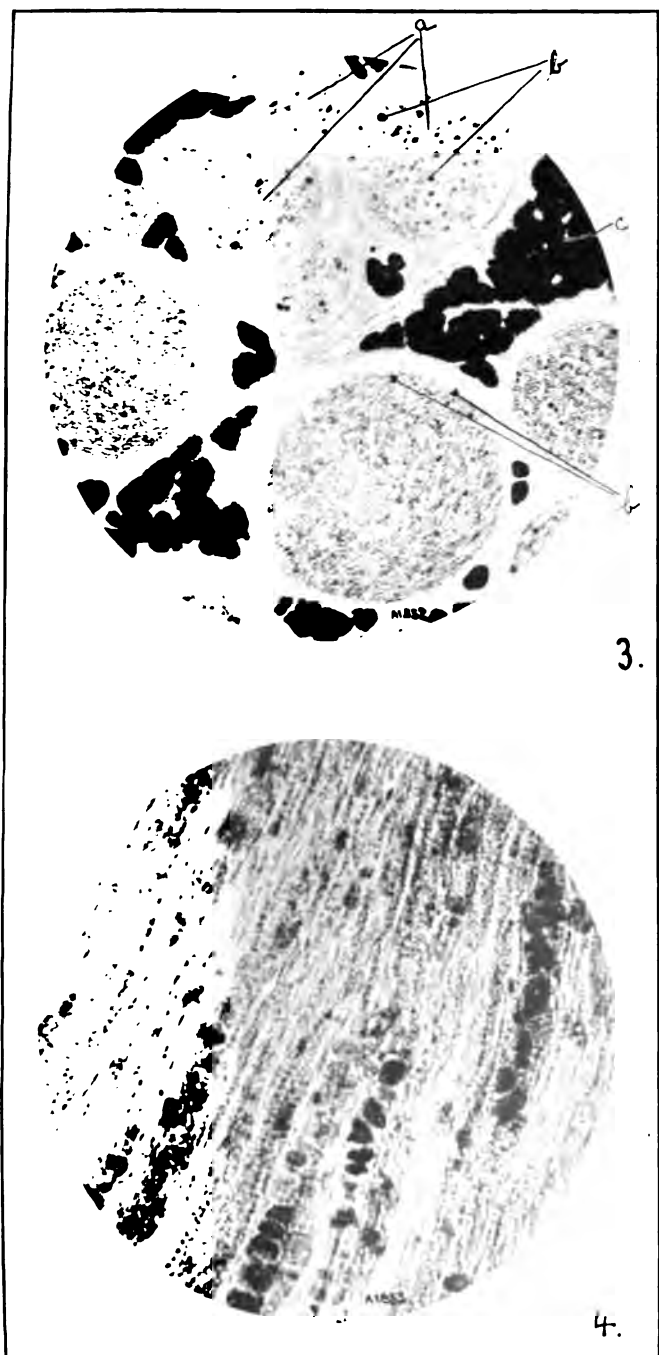
In the degenerating nerve fibres the myelin detritus is seen as black clots.



2.

Paralysis of Pigs. PLATE I.





Paralysis of Pigs. PLATE II.

HOG CHOLERA*

EDW. A. CAHILL, Boston, Mass.

For many years it has been the belief in the East that hog cholera was a disease peculiar to the corn belt section of the West, and rarely seen in New England. Although it was known that large numbers of swine died each year, it was thought that the cause of these deaths was pneumonia, and in some instances inflammation of the bowels. Statistics showed that whereas in 1912 there were 98,836 head of swine in Massachusetts over six months of age, that in 1914 this number had decreased to 59,221, a visible decrease of 39,615 in two years.

Acting on this knowledge, the Massachusetts Department of Animal Industry started an investigation to ascertain the cause of this decrease. The result of this investigation showed that approximately 5% of this decrease was due to a shortage of garbage, and that the remaining 95% was due, not to contagious pneumonia, as had formerly been supposed, but to hog cholera.

It was learned that hog cholera, as seen in New England, differs somewhat from the type usually seen in the West, and that the acute form was less frequently seen but that we had to deal with a more chronic form, combined with a secondary infection by an organism known as *Bacillus suisepiticus*. This secondary infection caused an associated pneumonia, which had given rise to the belief that the disease was true pneumonia. One of the reasons for this belief was the fact that the majority of the animals which died did so in the late summer or early fall, as the weather commenced to get cold; and secondly, to the fact that the big majority of the losses in large droves of swine were in animals weighing from 40 to 80 pounds, whereas the mature stock seldom, or never, died from this disease. The explanation of this condition is as follows:

The majority of the large piggeries in this state we found to have been infected with the form of hog cholera already described for many years, and because of this fact, the mature sows were either fully or partially immune to the disease. It is a well known fact that pigs from immune sows are themselves immune

*Abstract of an address delivered at Farmers' Week at the Massachusetts Agricultural College.

while nursing, but that as soon as these animals are weaned, this temporary immunity begins to wear off, and about the time the animals reach forty pounds weight, this immunity has entirely disappeared. It might be remarked in passing that pigs are weaned earlier in the East than the West. These animals are then susceptible to the disease, and commence to die, and it is a fact that many of the large piggeries in the state have lost thousands of pigs between 40 and 80 pounds weight. The pigs which survive this period have almost invariably had a light attack of the disease, but recovered. They are, therefore, immune, and no trouble is seen from this time until the next litter of pigs reaches this age. This condition is rarely seen in the West, where the acute type is seen more frequently, and where the mortality averages nearly 100%, and this knowledge furthered the belief that the disease seen here was not hog cholera.

This condition of chronic hog cholera having existed for so many years unrecognized, particularly in the large piggeries which sell pigs all over New England, has resulted in hundreds of cases of hog cholera being spread by the distribution of these pigs. It is a common occurrence to find the owner of swine who has never had hog cholera in his herd until he purchased a few pigs from one of these large piggeries, and within a short time having a severe outbreak of cholera throughout his entire herd, even though the animals coming from the infected piggery might be apparently well. This condition has undoubtedly spread more cholera in New England than any other method.

Among the many other ways that cholera has been spread, must be mentioned the enormous flocks of crows which travel from piggery to piggery particularly where garbage is fed, stray dogs and cats, skunks, field mice, the interchange of labor, traveling butchers and salesmen, and our numerous transportation companies.

We must remember that our local conditions are entirely different from those of the West, and more conducive to the spread of this disease. The majority of our swine are garbage fed, and garbage is one of the greatest means of spreading the disease, both through pork scraps which it may contain and the fact that in our large cities the swill is generally collected and brought to a central distributing point. In some instances, as many as two hundred farmers from the surrounding country meet at this central distributing point to obtain garbage for their swine and you can read-

ily appreciate the fact that this often acts as a central distributing point, not only for garbage, but for hog cholera as well.

Until quite recently, no serious effort had been made to control this disease, and no preventive or curative methods were known with which to combat it. Consequently, it was the common custom when cholera was diagnosed in a herd, to kill the infected animals and butcher the ones which were apparently well, leaving a badly infected premises from which cholera could be spread, and putting meat into circulation which in turn caused more trouble.

Realizing that the disease is an extremely contagious one, and because of the above-mentioned conditions, had resulted a condition wherein the majority of the piggeries in this state are either infected with hog cholera at the present time or have been very recently, and that this condition was rapidly ruining the swine industry of the state, the Massachusetts Department of Animal Industry nearly two years ago started a campaign for the control of this disease which consisted of the application of the serum treatment as a preventive and cure, and an educational campaign.

Those of you who read in agricultural publications of the experiences of persons who have used the serum treatment on their swine, know that the utmost confusion and difference of opinion exists as to the value of the treatment. You know that in some sections of the country it is hailed as a blessing, whereas in other sections it is condemned as a curse, and blamed for the spread of the disease. It is a well-known fact that the serum treatment has been responsible for the spread of hog cholera, in instances when the serum used was not potent or virus not virulent, and therefore dangerous; and in other instances where perhaps the best serum and virus were used improperly by incompetent persons. Contrasted to this, are seen sections where the most beneficial results have been derived by the proper use of good serum and good virus by competent persons. Therefore, we considered that it was of primary and utmost importance to control the use of serum and virus, and consequently its use has been restricted to the Department of Animal Industry. It is against our regulations for any serum or virus to be shipped into the state, except to the Department of Animal Industry.

Notwithstanding the fact that the U. S. Government makes a test on serum and virus before it leaves the manufacturer's hands, every shipment of serum and virus after arriving in Massachusetts

is tested by a special test to prove to our satisfaction that it is of the highest quality and that the consumer is being safeguarded. After being thoroughly tested, it is properly kept until it is placed in the hands of agents of the department, who are men specially trained in this work, who are paid by and responsible to the Commonwealth. This, therefore, acts as the greatest possible safeguard to the consumer, and is a guarantee against the spread of the disease through the use of products which are not what they should be or by improper use of good material. While this method prevents some persons using serum and virus who are perfectly competent to do so, it prevents the many possibilities of the spread of the disease by the means before mentioned.

Since the campaign to control hog cholera was started, approximately 35,000 head of swine have been treated, and we know that in many large herds where formerly hundreds of animals were lost yearly, the losses have been reduced to practically nothing, and it is a fact that the disease is on the decrease, and that the number of swine in this state is increasing very rapidly.

Realizing that the simultaneous treatment, when properly applied, is an absolute preventive, and that practically all swine in this state are exposed swine, we are advocating the simultaneous treatment for all swine which are healthy. This must be considered in the form of insurance, inasmuch as animals can be immunized as a preventive at the minimum cost with the maximum amount of protection, and that the cost of this insurance for healthy animals is not over 1c per pound, which pays for the serum and virus, the state defraying all other expenses. This immunization work is carried out only at the request of the owner, and cannot be given to animals after they become infected. Infected animals must receive the "serum only" treatment, and it must be remembered that the money entailed in the loss of one or two brood sows would more than pay for all the serum and virus which would be required on a large number of animals. Where the serum is used, however, on sick animals, the results must necessarily be different. Although no person claims a great curative value for serum, we know that it has some curative value. The degree of this, however, is always more or less of an uncertainty, and depends largely upon the stage of the disease at the time of treatment.

A few of our statistics for the last year may prove of interest. In approximately 250 herds which were infected, the animals were

divided into two classes; first, sick animals showing clinical symptoms, or temperatures over 104; and secondly, apparently well animals in these infected herds. In these herds, approximately 7000 head of swine had died without treatment previous to our assuming control. The remainder of the sick animals, 10300 in number, were given the "serum only" treatment. Of this number, all lived except 718, or 7%. The remainder, which constituted the apparently well animals, were given the simultaneous treatment. There were 5,826 such treatments. Of this number, only 70, or 2.2% died. This is in strong contrast to the usual mortality where serum treatment is not carried out, which as you all know, varies from 85 to 100%.

In 90% of these herds the losses of young pigs had varied from 50 to more than a thousand yearly, and the owners considered it necessary to expect these losses. The treatment has now been carried out in some of these herds for two years, and during both years practically the entire number of young pigs born has been raised without any losses from cholera. It must be realized that the treatment was being put to a severe test under the conditions of all animals being garbage fed, and cholera having existed in the herds from five to twenty years. Where the treatment has been used as a preventive, and no cholera existed at time of treatment, only one out of approximately 6,000 animals treated has died with hog cholera following the treatment.

This illustrates the fact that when properly tested serum and virus is used under proper restrictions by trained men, the danger from simultaneous immunizing is practically nil, and I want to go on record as saying that if we are to stop the spread of hog cholera by the simultaneous treatment, the states which are not restricting the use of serum and virus, and are not testing the same after delivery, must adopt restrictions a little nearer those which are in vogue in this state.

I would like it distinctly understood that I do not maintain that the policy advocated here and followed by the State of Massachusetts is the policy which should be carried out in all states. Local conditions must always govern the plan for control, and while the promiscuous simultaneous treatment is advisable in Massachusetts, due to the almost universal feeding of garbage, the close proximity of piggeries to each other, and the fact that practically all swine are exposed swine, this would not apply to some states where

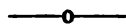
whole territories larger than our state are free from the disease. It is a fact, however, that unless the use of serum and virus becomes restricted, and under the jurisdiction of the state authorities, that the time will soon come when there will be no territory which is not infected.

We offer the following general routine as the best method for farmers throughout the state to follow as regards hog cholera: To have the Department of Animal Industry immunize by the simultaneous method all of their swine above 40 pounds weight. These animals are then permanently immune. The pigs from sows so immunized will be immune while nursing. At weaning time, these pigs should be given a small amount of serum, which will usually protect them until they are twelve weeks old. At this time, they can be given the simultaneous treatment at the least expense, and the immunity will be permanent. This is done with the idea that the owner is going to continue the work and keep all swine immunized as they may be purchased or born.

In closing, I would offer a word of advice to those of you who do not immunize your swine. Do not purchase pigs from large piggeries which do not immunize their swine. You can purchase animals from other piggeries just as large and just as good which are immunized when you buy them. The men who are doing this should have your support, and in addition you are protecting your own interests in acting in this manner. Make it a practice to quarantine on your own premises all new swine for at least thirty days before they are placed with your herd, and lastly, insist that all animals, regardless of where they come from, be thoroughly dipped in a good antiseptic solution the last thing before they are put into the herd. This will prevent a large amount of trouble, and may save you many dollars.

The serum treatment is not compulsory in spite of the fact that there is already a large demand on the part of swine owners who see the value of this treatment, to make it compulsory. It is simply an effort on the part of the Commonwealth and the State Livestock Sanitary authorities to do their share in helping the farmers prevent the hundred million dollar loss which is the yearly toll of this disease. Some there are who boast of the fact that they do not need to immunize their swine even though they have the disease in their herd, and it is these men more than any others, who make others pay the heavy loss which is the toll demanded for the right

of our independence in refusing to immunize swine. If all the swine in this state were immunized by the simultaneous treatment for the period of a few years, the disease would die out of its own accord for the want of susceptible animals on which to propagate itself, and this frightful loss would be stopped.



THE NATIONAL HORSE

R. VANS AGNEW, 5th Cavalry, Fort Leavenworth, Kans.

We need several Government Breeding farms of ample size, located on the best of soil so as to breed a superabundance of bone substance in our animals. The Government Farms to be so centrally located as to be practically free from invasion. In this European war it is authentically reported that the Russians, in their first invasion of Prussia captured and sent back to Russia 20,000 head of thoroughbred mares belonging to the large Government farms. This is a fearful loss to any country.

Also, these farms can breed high types of blood horses that can be used as remount stallions to be placed in different parts of our States where no privately owned sires are operating. This will to a certain extent insure the army type we want, particularly if we charge a nominal price to mares of approved type.

But what we really should put into effect is the giving of large enough National Remount Premiums so that owners of good stallions and mares would not want to sell them to foreigners, especially if we make a law that the animals are not to leave the country for a certain number of years after winning a premium. These National Premiums should be financed by the Federal Government and managed by a National Committee composed of noted horsemen (like members of the Jockey Club), noted breeders and army officers (retired or in the service). The judging of these premium competitors in each state to be done by one person chosen by the committee; the head of the State agricultural school and the State veterinarian.

In order to start this, there would have to be census taken of all the thoroughbred stallions in the country and a registration made of those that were sound enough for service as premium competitors.

That the castration or altering of young thoroughbreds be checked as much as possible (it would be if premiums were started).

That laws be passed in every state that only pure bred stallions of each type be permitted to serve mares for a fee.

That full information in regard to the breed, sex, age and value of all horses imported and exported be made by owners to the Government.

That every year each State awards two National premiums of the value of \$15,000.00 each for the stallions; six National premiums of the value of \$100.00 each for mares and six National premiums of the value of \$100.00 each for foals.

Mares not to be awarded premium unless they have a living foal by a premium sire or drop a living foal to one the next year; mares to be between three and fourteen years old. Foals not to be awarded premiums unless a guarantee be given by the owner to sell the animals when they are three years old to the Government for \$150.00; no foal to receive more than one premium.

Premium stallions to be stunted, to not less than seventy mares a year at a fee of \$5.00 per mare to be paid by the owner of the mare. That the premiums be competed for at each State Fair and at any other horse show in the States chosen by the committee.

This system will greatly interest the farmer and breeder in our remounts and encourage him to keep the right type of animal. The committee should have the power to buy any high-class stallion that was in danger of being sold to another country and turn him into the National Remount System. It should award special prizes to the breeders of premium winners. It should give prizes at the shows in each State for the best remount horse for cavalry or artillery.

It may be said that some States cannot raise a good enough class of animal for army work owing to the climatic conditions, etc., but this is largely imagination, it is a question of good parentage, good food and plenty of exercise. A good Northern horse will do no better than a good Southern horse, when it comes to speed and stamina. The more bracing climate of the Northwest adds to the vigor of its horses, but a Southern horse taken up there will become just as vigorous under the same conditions. In fact the climate that permits of grazing the year round is the most ideal one for the breeding of horses if the grasses are rich in the proper constituents that promote bone and substance, a horse properly

raised in a temperate region can be taken to the severest climates either hot or cold with complete assurance that he will do satisfactory work. The thoroughbred has proved this beyond a doubt.

This Federal aided National system will be most beneficial to both breeder and racing man, the one gets better prices for those he breeds, the other can sell his retired racers for a larger figure. It is a question of preparedness, even the non-preparedness advocate cannot object to improving the horses of his country.

As a national question I earnestly hope, that our great horse-owners, breeders and racers will not look at this horse business from the narrow view of home or local state politics, that enough of them will get together as soon as possible and draft a far better scheme than the one I have ventured to outline, that they will then give it to some horse loving, patriotic Senator or Congressman to pass into a law that will be of incalculable benefit to us and our descendants and their descendants.

For the small sum of about \$275,000 dollars a year we can start the National improvement breeding system that I have roughly sketched, surely Congress will not begrudge the people that paltry amount when it has the examples of other nations who are giving millions towards the betterment of the light-horse breeds of their countries.

Let us do something for the National Horse.—*Thoroughbred Record*.

At the Panama-Pacific International Exposition held at San Francisco, Cal., last year, the "American Veterinary Medical Association Day" (September 3, 1915) was, in point of attendance, one of the largest convention special days. A total of 70,560 people passed through the gates on that day. There were 928 conventions in the exposition series and these were largely responsible for the large attendance and for the very satisfactory financial showing that has been made.

CLINICAL AND CASE REPORTS

CASE REPORTS OF LYMPHANGITIS IN CATTLE CAUSED BY AN ACID-ALCOHOLIC FAST ORGANISM

J. TRAUM, Agricultural Experiment Station, Berkeley, California.

On November 20th I received for examination a nodule about the size of a hen's egg, which had been removed on November 18th from the subcutaneous tissue of a cow corresponding to a point about the center of the humerus. Upon section this material was found to contain in its center an area of coagulation necrosis about the size of a hazel nut, surrounded by a dense connective tissue which in turn showed many small sized necrotic foci. Smears made from these necrotic areas and stained by Ziehl-Neelsen method, decolorizing with 20% sulphuric acid and also with 95% alcohol or with 3% acid alcohol (hydrochloric), showed organisms which could not be distinguished morphologically or tinctorially from tubercle bacilli.

The history of the cases concerned, as reported to us, is as follows: Early in October the above mentioned cow (No. 1, figure 1) and another cow (No. 2, figure 2) each presented an enlargement about one and one-half inch in diameter, back of the knee, in cow No. 1 the left knee being affected, in cow No. 2 the right. The dairyman had been treating these with tincture of iodine. This treatment produced no apparent improvement. The abscess on cow No. 1 was discharging a cream colored, glutinous, odorless pus, containing yellowish, calcareous granules at the time when the nodular mass above mentioned was removed. It was found then that the disease process had extended on the external face of the limb up to the shoulder joint, following the course of the lymphatics, and manifesting itself in the form of corded nodular masses varying from the size of a bean to that of a goose egg. In cow No. 2 the disease presented a similar picture, but was not so extensive, the nodules being smaller and fewer in number.

As indicated above, the microscopic examination suggested a diagnosis of tuberculosis, but the location of the lesions on the three animals (another cow, No. 3, having developed similar lesions on the right front leg) together with the fact that although semi-

annual tuberculin tests were made no reactors had been found in this herd during a period of two years, did not warrant this diagnosis. Another nodule was removed from cow No. 1 on November 24th, carefully handled, and taken to the laboratory and upon microscopic examination revealed the presence of acid-alcoholic fast organisms which resisted the action of antiformin.

In the middle of December a fourth cow showed four small subcutaneous nodules in back and a little below the left knee.

The nodules in all these animals were firm on palpation, but all the removed nodules were found upon section to contain necrotic areas which in most instances had reached a stage of liquefaction. Some of the nodules were difficult to remove intact, since the pus had made its way to their outermost zones. Histologically the nodules showed a structure similar to that found in the granulomata. Giant cells and acid-alcoholic fast organisms were observed in the sections, in some instances the organisms being abundant, in others very scarce. Tubercles, found upon microscopic examination, especially the small ones, were indistinguishable from those caused by the tubercle bacillus.

The organisms in the solid necrotic areas were more plentiful than where liquefaction was present. In most instances, they were 3 to 5μ in length and beaded, appearing to be made up of two or more coccoid or bacillary members; some were fine, thin, straight rods, about $2\frac{1}{2}$ to $3\frac{1}{2}\mu$ in length, others were slightly longer and slightly curved or bent, others still showed one end larger. Coccoid forms were also found. The organisms retained the color when stained by the Gram method. When stained by the Ziehl-Neelsen and counterstained by the Gram method, organisms with one or two acid fast portions and a Gram positive granule were observed.

On February 12th pus that had been obtained by Drs. Hill and Caldwell of Oakland from the vicinity of the fetlock joint of the left hind leg of a cow (No. 5) was brought to my attention by Dr. F. W. Wood of the Cutter Laboratory. This pus appeared very similar to that obtained from cows 1, 2 and 3. Microscopic examination in this case also showed similar acid-alcoholic fast organisms. Drs. Wood, Hill and myself visited the dairy, owning cow No. 5, on February 19th, and found a sixth case. In this last case we found a soft tumor, about one inch in diameter, back of the right knee, and nodular masses extending upward to a point below the shoulder on the outside of the leg, very like those found in the other cases. In

case No. 5 at one point the pus had made its way to the surface from a small nodule, presenting an ulcer which was very like in appearance to the buds found on the limbs of farcy horses.

The clinical picture suggested streptothricosis (*Farcin du boeuf*). The presence of acid fast organisms did not tend to weaken this diagnosis, but rather supported it, since bacillary acid fast forms have been described as being present in this disease. In all our work, however, we were unable to find any branching filamentous forms. The large number of tubes of varied culture media inoculated from these cases have thus far failed to yield any definite results. Animal inoculations have up to date been of no assistance in establishing a definite diagnosis. They, however, eliminated mammalian tuberculosis, since a large number of guinea pigs inoculated subcutaneously and intramuscularly with material, which, as evidenced by microscopic examination, contained a great many acid fast organisms, failed to develop tuberculosis even when allowed to live for two months.

The allergic tests were interesting. All six cows were tested intradermally both with a streptothrichin, prepared from *Streptothrix nocardii* grown for five weeks on 4% glycerin bouillon and prepared after the manner of Koch's O. T. and used in 20% strength, and with a 50% dilution of avian tuberculin (the latter kindly furnished by Dr. Van Es). Cows 1, 2 and 5 gave distinct reactions to the avian tuberculin, while cow 3 gave a doubtful reaction. Case 1 gave an equally strong reaction to the streptothrichin, while cases 2 and 5 failed to give a decided reaction to this test. Cases 4 and 6 failed to react to either of these tests. Cases 1, 2 and 3 were ophthalmically tested with streptothrichin and case 1 again gave a marked reaction, while the others were negative. Cases 1, 2, 3 and 4 were tested with ordinary veterinary tuberculin, 1 and 2 being tested subcutaneously with 10% O. T. and the others intradermally with 50% O. T., and the results were negative in all cases. All four were then given the ophthalmic test for tuberculosis and again the results were negative.

The failure of the animals to react to streptothrichin, while reacting to avian tuberculin, may be partly explained by the fact that the former was used in weaker dilution and was prepared hurriedly and was probably not as active as the avian tuberculin. The reactions indicate, however, that the causative agent belongs to the group of acid fast organisms more closely related to the strepto-



Case 1



Case 2

thrix than are the mammalian tubercle bacilli. The failure thus far to grow the organism and the reaction to avian tuberculin also suggested an organism very much like the one responsible for Johne's disease (Enteritis paratuberculosis). The usual clinical manifestations of this disease, however, have never been found in either of these herds.

Further studies and a more detailed record will be published later.

—o—

A TWO HEADED CALF

W. G. HUYETT, Wernersville, Pa.

A monstrous foetal calf was delivered, by me February 27th, from an eight year old grade Holstein cow, with two fully developed heads, each having a separate neck, uniting posteriorly to form a



single body. The foetus was about seven months old and had died *in utero*, about two days prior to indicating symptoms of abortion. Posterior presentation with both hind limbs flexed at hocks. The mother had twins two years previous.

—o—

A THREE CHAMBERED HEART IN A HEIFER

PAUL RUNGE, Newark, N. J.

Of all the organs which help to make up the anatomy of an animal the heart receives the least attention upon postmortem by the average practitioner. This being due perhaps to the small

number of heart diseases and abnormalities found in animals.

This condition of two auricles and one ventricle in the same heart was found in a pregnant heifer which was killed for food purposes; the animal being in good condition.

No temperature was taken; neither was the frequency of respiration or pulse noticed but no doubt this heart would have been a very interesting one to auscult.

My attention was first drawn to this condition by the fact that



it was much larger than the normal heart, and by the fact that its shape was greatly altered, the apex being rounded instead of pointed and the anterior straight and posterior concave borders were both convex, in fact the heart appeared more like a ball than like a cone.

I opened the heart through what I thought was the wall of the left ventricle from about two inches above the apex, cutting upward through the middle of the auricle and much to my surprise I noticed that both atrio ventricular orifices opened into the same chamber. Further examination showed that there had been no second ventricular chamber and that the ventricular septum was absent. All other structures such as the mitral, tricuspid and pulmonary valves were all normally present.

In the above illustration letter A shows the lower end of a piece of gauze through the aortic orifice, letter B a piece of gauze through the left auricle, letter C a piece of gauze through the right auricle, and letter D shows the single ventricle.

A CASE OF THROMBOSIS

JOSEPH A. DEGROODT, Mendham, N. J.

On February 27th, 1916, I was called to see a chestnut mare of about 23 years of age, with a peculiar history. After asking a few questions from the owner, (who was a lady), I suggested that I hitch the mare up and drive her, so as to bring out the symptoms.

After I had driven about a mile, the mare stopped, held up her right hind foot, and trembled. I then turned her around and started for the house, but before I reached there, I had to give the mare several rests for when urged to go, she would almost touch the ground when she put any weight on that foot. She broke out in a sweat, the water running from her in streams.

It was all I could do to get the mare unhitched and take the harness off before she was down. She tossed and rolled, got up and drew up her foot, then lay down again.

I examined the limb and found it a great deal colder than the others. In about a quarter of an hour she was standing and acting normally again.

I then asked the owner how long the mare had been acting this way. She told me for about a year or so the mare hadn't the life which she had always had, and that for the past couple of months she had acted just as I had told her the mare had acted with me.

A diagnosis of a "Thrombosis" was made. As the animal was so old I advised its destruction which I made three days later.

Upon post-mortem I found an antemortem clot in the right branch, about an inch from where the posterior aorta bifurcates, which almost entirely filled up the artery. The major part of the clot weighed a little over four ounces and extended into the several branches.

MACERATION AND DECOMPOSITION OF THE FETUS IN MARES

S. R. HOWARD, V.S., Hillsboro, Ohio.

I believe that all trustworthy veterinarians have a just right to the inheritance of the experience of their predecessors.

This is a gangreno-necrotic process, or in simpler words, is a rotting of the fetus due to the hindrance of its expulsion. The hin-

drance may be one of a great many that occasionally are present, but this hindrance is never complete, for air must enter the womb else we would have mummification.

I wish to refer more especially to this condition occurring after the normal time of parturition in the mare alone. Fleming states twelve cows to one mare is the relative proportion of cows to mares in this trouble. Standard works refer to this particular subject in a very painfully guarded and limited manner, confining most of their study to the cow. The contemplation, or even the remembrance of such cases in one's practice is anything but an Elysian dream. I have often wondered if this was not the reason why so few mare cases are recorded, and perhaps another reason is that most all mares so afflicted die. Why all such cases do not die of metritis and putrid infection, to me, is one of the greatest wonders of nature.

It is well known to those having had extensive experience, that some mares when endeavoring to expel the fetus, will strain, struggle violently, and persistently for perhaps only a short time, and are not seen to strain again unless manipulated. These are the only kinds of cases I especially wish to refer to. Their limited and ineffectual straining is sometimes passed unnoticed by the attendant, and the case may be one where partial or complete obstruction to foaling is present. Then, sometimes even the careful attendant might believe the colt was stolen, lost, devoured or that it was a case of "false conception" (whatever that may be). In all my experience I have never delivered but one live colt where an hour or more had elapsed from first signs of straining.

The mare is alone and attempts to foal. The fetal membranes are ruptured and separated from the face of the womb, the liquor amnii escapes, the os is dilated, air enters, and the colt usually smothers, and dies at once unless quickly expelled or delivered. If not delivered, as a rule the wretched mare is then doomed to a miserable death, or a suffering and pitiful existence until she is relieved.

Of course to the fetus, emphysema occurs in a very little time after death under such circumstances. This is the period when the obstetrice is often called, and when the introduction of the hand is difficult if not almost impossible owing to the bloated condition of the fetus, dryness and congestion of the womb.

In my obstetrical bag, as the M.D.'s say, I carry instruments in a roll, a sleeveless coat, a pair of overalls, pump, bottle of antiseptic, a pair of rubber gloves, and last but not least a dusting can of powdered slippery elm. I like it better than oils or grease. With warm water an emollient emulsion can be quickly prepared and injected. Use plenty. To slightly powder the dampened arm and hand is good practice.

Rubber operating gloves (they are cheap) should always be worn when manipulating in such cases. Neglecting this precaution upon two occasions, I have almost lost my life from infection. To care for the gloves when not in use, I cover them inside and out with corn starch and keep them in a very shallow, full length box.

I can not see how a veterinarian in general practice can be surgically clean but I do claim we should always try to lessen our danger to infection.

These cases are not in the least alluring, and the obstetrict must not approach them in haste and overconfidence. He should have physical endowments not to be sneered at, a stout heart, a long arm; he should not be hungry, wet or cold, and as Fleming states, "he must be gifted with presence of mind, coolness and fertility of resource so as to take in all the circumstances of the case, devise his method of procedure and carry it out promptly."

I know a little, lithe Irishman who has quite a reputation as an obstetrict in a cattle raising neighborhood. While he is uneducated, yet rather intelligent, he has proven himself a valuable acquisition to the district. He has never used an instrument of any kind, save some small ropes. He has powerful arms and fingers, is active and resourceful. He informs me, in some cow cases he has used his bare foot and leg as a repeller while laying hold of root of tail of the cow. I have never before read or heard of such a repeller, but I have heard of a number of cases where he used his small naked foot successfully.

Of all the foul, stinking, dangerous and disgusting operations we are called upon to perform I believe the treatment of cases of maceration is beyond compare. Some such experiences of country veterinarians would challenge credulity. It is taught that when liquefaction has taken place the prognosis is more favorable. This I think to be true, but very few mares live to that stage.

In time the bones of the head become disconnected, the epiphysis and diaphysis separate and all the bones more or less disconnect,

the soft structures liquefy, and the horrible death-stench discharge usually takes place, alongside of which a polecat is a refreshment. The internal face of the womb exudes a muco-purulent discharge which further adds to the softening of the festering mass.

After carefully reading what literature is available to me on this subject, I can not see that I can add to it much of value, save to state that in some cases considerable force even with a hoist will be necessary to take away the ribs, vertebrae and pelvis. These bones seem to be the last to disconnect from each other.

As an illustration, this case may be interesting:—

"Nell", fat four year old, 1600 lb. brown mare, due to foal April 2, 1912. Owner, William Aitkin. Mare worked on farm regularly before, during and after foaling time to July 9th, one week and three months past due. At foaling time she had the usual premonitory symptoms of readiness to foal, but no one noticed any restlessness, straining, discharge, signs of having labored or struggled, nor any acute signs that the event should take place. She was looked at several times each night for a week or more, but each time she seemed all right. The owner, an experienced horseman and extensive breeder, then supposed the colt had been lost in a large pasture, as no trace of it could be found.

An observing and careful man continued to work her, watching her narrowly all the while, she retaining her usual good spirits and flesh, but finally lost her milk and shrank in abdominal girth. The owner consulted me several times in the three months and without seeing the case, I each time ventured the opinion that she still retained the fetus. Owner not assenting to a visit, the mare was left to expectancy. No odor or discharge was at any time noticed. This I can not understand. She came in heat regularly, and was served by the owner's stallion five days before I was called, July 10th.

DeBruin states that oestrus may occur regularly with such patients, and that conception is possible. This, I grant, is true but judging by the paucity of the records of such cases, conception must be extremely rare. Over three months beyond time of foaling the mare came out of the barn to go to work, having symptoms of slight laminitis. I was called. Ignoring the laminitis, I found upon exploration, the womb open and a transverse dorsal presentation of a slimy and bony vertebral column. In such cases if weather permits, I remove all my clothing, and don a suit of overalls. It

required several hours to carefully remove the remains which consisted of bones, and several gallons of corruption or completely disorganized tissue of about the consistency of soft soap, plus the usual stench.

It demanded the assistance of three strong men with a hoist to pull away the vertebral column and pelvis. The womb was then injected with a large tubful of warm antiseptic and deodorizing water. I then used a large tubful of the same on myself, and went to dinner. After dinner we gave her another, but smaller uterine injection, swabbed her feet and left. The next day she was doing well, save having a rather severe case of metastatic laminitis, which in spite of care and rest, lasted until late in the fall, leaving her with slightly ramy hoofs and almost inconsiderable chronic founder. She was given another large injection and released to the owner's treatment.

She is now in splendid condition and has been frequently bred, but up to the present has not conceived. She was very well sold lately at public auction and is a very serviceable animal, all of which is a source of considerable satisfaction to me.

BETTER STABLE CONDITIONS FOR COWS. In an article in the *Lancaster Daily New Era*, Lieutenant-Governor Frank B. McClain calls the attention of the Eastern Pennsylvania farmers to the necessity of different housing conditions for their cows and steer cattle, and if better housing conditions are not provided, the "freight" will have to be paid by the person who refuses to recognize this necessity.

The reason why Virginia cows and Western cows and even Northern Pennsylvania cows have the preference is because in the carcass very few of them show evidence of tuberculosis. The explanation of the healthier condition of this class of cows is that they have more outdoor life in day time throughout the entire year, and at night time, in the winter, are not housed in air-tight barns. It therefore behooves the farmer to give some attention to better barn ventilation as a preventive of tuberculosis among his cows and steers, otherwise he will find it expensive when he comes to dispose of his live stock.

ABSTRACTS FROM RECENT LITERATURE

STRYCHNINE POISONING IN A DOG. Henry Taylor, F.R.C.V.S. *Veter. Jour.*—A fox was poisoned with strychnine. A dog came home with the head of a young rabbit in his mouth. His abdomen was distended and full. Had he partaken of the poisoned fox? After remaining quiet for six hours, he suddenly got out and had a fit which soon passed off. Attempts to give him a dose of castor oil failed and a small pill was offered in a bit of meat. He took it. After an hour, he developed the characteristic symptoms of strychnine poisoning. Chloral hydrate and bromide of potassium in large doses were prescribed. Fit after fit continued but chloral was still administered until after some time the next morning after a series of attacks he was finally awakened from the apparent sleep he was in. He then looked drowsy but gradually improved and got over all his troubles. The interest in this case rests on the length of time which had elapsed between the partaking of the poison and the onset of the first fit, *six hours* and the recurrence of the fits while the dog was under the influence of the antidote, viz: large doses of chloral.

A. LIAUTARD.

IS LEUCOCYTOZOOM ANATIS THE CAUSE OF A NEW DISEASE IN DUCKS? Wickware, A. B. *Parasitology*, 1915, June, Vol. 8, No. 1, pp. 17-21.—(The paper is of considerable interest in the light of recent enormous outbreaks of a fatal disease among ducks in California (Tulare Lake, etc. and Utah.)

The author studied an outbreak at a poultry farm, where heavy mortality prevailed. The malady ran a rapid and fatal course. The prodromal symptoms were very slight. Some died in the first attack, others after several exacerbations. The birds lie in a semi-comatose condition, but, if aroused, undergo remarkable contortions of the head and body. They lose the power of controlling equilibrium. The recovered birds are stunted and undersized. The mortality is 65-70 per cent.

Leucocytozoa (*L. anatis*) were found in large numbers in ducks in which the infection ran an acute and fatal course. Transmission experiments were successful in one instance only.

The author is not prepared to accept the *Leucocytozoon* as the causative agent of the disease, but he gives reasons for its probably being the excitant and for the failure to transmit the parasite. The paper is well illustrated.

K. F. MEYER.

ENORMOUSLY ENLARGED PROSTATE ABSCESS IN A DOG. Arthur Payne F. R. C. V. S. *Veter. Journ.*—Half bred collie, eleven years old. For three months he had been losing flesh, and yet had a good appetite. He passed a small quantity of urine, which was occasionally tinged with blood. One day he had more difficulty in micturating and from that day refused all food.

On examination per rectum, the enlarged prostate gland was detected. The bladder was congested, and engorged. The dog looked very sick, yet when he was called, he came and urinated freely. Urotropine was prescribed. Finally the poor sufferer died a natural death. At post mortem, one and one-half pint of urine was found in what was taken for the bladder. On the right side of this sac, was one that proved to be the true bladder. The prostate was hypertrophied. The second bladder which was the normal organ, showed that the first sac had been made by the giving way of some muscular fibres, which had let the vesical mucus pass through and allowed the formation of a pocket, a diverticulum of the bladder.

A. LIAUTARD.

SUR LA CULTURE DU PARASITE DE LA LYMPHANGITE EPIZOOTIQUE, (The Culture of the Epizootic Lymphangitis Microorganism). Nègre L. et Boquet A. *Bull. Soc. Path. exot. VIII. 1915; 10 fevr.*—By inoculating the water of condensation of glucose agar and incubating the tubes at a temperature of from 24 to 26 degrees C., the authors have succeeded in growing the *Cryptococcus farciminosus*. The culture was very adherent to the medium and consisted of mycelia and irregularly shaped bodies, varying in size from 4-6 μ . Subcultures were successful.

(The reviewer isolated, in 1912, an organism from typical pus collected from a case of epizootic lymphangitis in Jamaica, which corresponds in every detail with the organism described in the preliminary note given by Nègre & Boquet.) Inasmuch as Dr. Bridre (from the Institut Pasteur in Mustopha, Alger) stated, in a personal communication, that at the time of writing—1912—they had not been able to cultivate the *Cryptococcus*, the reviewer considered his organism to be a contamination.

For further information see K. F. Meyer,—Epizootic lymphangitis and sporotrichosis. (Studies on American Sporotrichosis II). American Journal of Tropical Diseases and Preventive Medicine. 1915; September; Vol. III; No. 3; pp. 144-163.) K. F. MEYER.

L'OFTALMO E L'INTRAPALPEBRO-REAZIONE NELLA DIAGNOSI E NELLA DIFFERENZIAZIONE DI ALCUNE TRIPANOSOMIASI. NOTA PREVENTIVA. (THE OPHTHALMIC AND INTRAPALPEBRAL REACTION IN THE DIAGNOSIS AND DIFFERENTIATION OF TRYPANOSOMIASIS. PRELIMINARY NOTE.) Lanfranchi, Alessandro. *Bull. Soc. Path. Exot.*, 1915, Mar., Vol. 8, No. 3, pp. 112-115.—It is frequently impossible to diagnose clinically the various trypanosomiasis of animals. With the object in view of finding a simple and certain method of diagnosis, the author made experiments using the ophthalmic and intrapalpebral reactions.

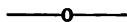
Dogs and horses with surra were employed, healthy animals served together with those infected with *T. brucei* as controls. Antigens were prepared from extracts of *T. evansi* in water, alcohol, glycerine, ether and chloroform. The technique was similar to that used in the case of animals infected with glanders and tuberculosis.

The conclusions are: using a glycerine or alcoholic extract of infective trypanosomes, it is possible by means of the ophthalmic reaction not only to diagnose surra in the dog, but to distinguish this from other trypanosomiasis.

In horses similar results were obtained. The diagnostic value of a slight rise in temperature from the intrapalpebral test during an afebrile period in infected horses has still to be determined.

(It would be advisable to investigate the value of this test in cases of dourine).

K. F. MEYER.



CAECAL ADMINISTRATION OF DRUGS. Doct. A. Bouchet. *Rev. de Pathol. Compar.*—The author proceeds as follows: A horse has colic. Whether tympanitic or not, tincture of iodine is applied to the right flank, in the region where the aseptic trocar is to be introduced. The puncture is made. The blade of the instrument is withdrawn and the canula of the instrument left in place, the mouth of a 10 centiliters syringe is introduced, carrying the drug, which is to be introduced. The injection can be renewed as often as the quantity of the solution requires, the canula of the trocar being left in place even if the animal is restless or while he is walking. Of course, if there is tympanitis the gases are allowed to escape first of all.

By this method, the author has often given tincture of opium chloral, and ether, separated or mixed and has relieved almost immediately animals which were suffering with very violent colic.

He has given in one day 50 grammes of chloral and 80 of ether and obtained complete anesthesia, which lasted 25 minutes. The author has advocated this mode of administration because of the difficulties which some times accompanied the giving of drugs in solution where given per mouth or per rectum. A. LIAUTARD.

Field Marshall von Hindenberg's letter of appreciation of the services of the veterinarians in the German army appeared in the *Tierärztliche Rundschau*, Oct. 1915, p. 357:

September 20, 1915.

From the reports submitted it appears that since the beginning of an organized campaign in April of this year, aimed at the eradication of glanders and contagious pleuro-pneumonia, diseases most dangerous to horses and to the troops dependent upon them, an extraordinary and permanent suppression of the epidemics has been accomplished. These services of the field veterinary corps rendered in the strongly infected Russian field of operations under adverse conditions are the results of a specially broad and self sacrificing sense of duty. I am given all the more occasion to express my appreciation of the successful suppression of epidemics because the veterinary corps has also rendered signal services among the troops, veterinary hospitals, military abattoirs, and in other field operations; especially in the preservation and replacement of the valuable supplies for horses. These circumstances give assurance that in spite of the military campaign in an infected country, with an energetic and foresighted prophylaxis and eradication of equine diseases, especially those that are contagious; the losses in difficultly replaceable horses will not exceed the unavoidable losses incident to forced marches and irregularities in feeding.

(signed) von Hindenburg.

Note by Abstractor. The above letter of General von Hindenburg should be of special interest to veterinarians in view of the bills now pending in Congress. These bills provide that the United States Army shall have a Veterinary Corps somewhat similar to those already in service in Europe, and that the veterinarians in the army shall have the RANK, pay, allowance, etc., of officers. In other words, that they shall have rank, which they previously have not had.

BERG.

PSYCHICAL TRAUMATISM IN A HORSE. Mr. L. Lepinay. *Rev. de Pathol. Compar.*—Seven year old gelding, returned from the front, in the infirmary of wounded or over worked horses. He was closely examined and presented nothing abnormal. He had no wounds, no elevation of temperature, was in quite good condition, was lively, trotted and galloped easily. He was perfectly quiet. *Why was he returned?*

Watched at feeding time it was noticed that he could not take his food from the ground, nor even from a low manger. Finally he knelt down and reached it.

The mouth, throat, ears, neck, anterior quarters, vertebral column were again examined. Not the slightest lesion superficial or deep could be detected. At each feeding time, he tried to take his ration, hesitated, made some attempts and finally spread his fore legs apart, knelt down with a groan and began and completed his meal in that position.

After a few days, he gradually improved but it took four or five weeks for all the symptoms to gradually subside and disappear. As he was an artillery horse and in the midst of cannon thunder, the question may be asked, did he get a nervous shock?

A. LIAUTARD.

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Intravenous Injection of Chloral Hydrate for Operative Purposes. Martens. *Zeitschrift für Veterinärkunde*, Vol. 27, p. 302, 1915. A solution of 50 grams of chloral hydrate in 400 cc. of water is used. The casting of the horse is brought about very easily by this method; the injection is stopped when the horse begins to sway. The narcosis is sufficiently deep. Undesirable after effects were not noticed.

BERG.

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TUMOR IN THE URINARY BLADDER OF A MARE. Susman. *Berlinger Tierärztliche Wochenschrift*, Vol. 31, pp. 461-462, 1915. I was called to examine a horse which had passed large quantities of blood and blood clots during the past two months.

Examination—Mare, over 12 years, emaciated and apathetic. External genitalia somewhat swollen and bloody. The urine received in a container was blood colored and contained clots, some as large as the palm of a hand, others as thick as a finger. There was no sediment from which information could be obtained regarding the cause of this abnormal condition. Rectal examination of the bladder

showed it to be as large as a man's head, tightly filled and pressed backward toward the anus. This diminished the lumen of the rectum and caused an accumulation of gas and feces on the oral side. The horse was raked to permit closer examination. Slight pressure on the bladder was painful and caused the evacuation of several liters of urine, at first red, later yellowish. After the bladder was emptied in this way, a large compact mass could be felt through the rectum, the significance of which was not apparent at first. A closer examination of the vulva and palpation of the vagina and os uteri disclosed nothing unusual. Catheterizing was easy, a finger could be easily introduced into the urinary meatus. This caused the mare to groan and strain, and some blood was passed. In this way it was found that the swelling was on the ventral surface of the bladder. The swelling was hard, like a cauliflower, and extended from the neck to the fundus of the bladder. A limited mobility indicated the presence of a neck or stalk by which the tumor was attached.

Diagnosis: Tumor of the bladder was highly probable. I attributed the hemorrhages to the rupture of capillaries caused by the distension of the bladder by the retained urine. This in turn could be caused by the movable tumor blocking the internal urethral orifice.

Treatment: Although I informed the owner that permanent cure could be brought about only by surgical treatment, and recommended slaughter, he requested that medical treatment be tried. I prescribed irrigation with 3% alum solution and daily doses of potassium iodid, 5 grams. As might be expected there was no improvement, and as a last resort the owner consented to surgery.

Operation: This was performed on the horse in the standing position, after rectal administration of chloral hydrate. The urinary meatus was stretched until two fingers could be passed through. I looked for the stalk of the tumor and found it. It was as thick as a small finger, and attached to the ventral surface of the bladder, about 3 centimeters from the internal urinary orifice. With the aid of the ecraseur, the stalk was cut and hemorrhage stopped with a 'Thermocauter'. Healing took place promptly and after effects have not yet been observed. Histological examination confirmed the diagnosis of tumor.

BERG.

INTUSSUSCEPTION IN THE HORSE. P. G. B. *Veter. Record*.—A six year old cart gelding had always done good work, had no illness and was in very fair condition. He was in the care of a careful and good driver. Returning from a journey, he showed slight abdominal pains, and got a colic draught. Relieved for the night, the next morning he was off his food, had a temperature of 102° F., cold extremities, ears and legs, his breath was short and he occasionally laid down. He remained in that condition for a few days, then stopped eating entirely but manifested great thirst. He took water heartily. After a day or two he had a fetid odor from the mouth and a peculiar gurgling sound was heard at the base of the neck. A diagnosis was made of abdominal abscess due to external injury. Prognosis unfavorable. The patient gradually lost ground. Violent purging set in. The animal, in walking, had a peculiar rambling gait. The illness lasted ten days and finally the horse was destroyed. The post mortem showed intussusception of the cecum within the large colon. The whole of the organ was drawn in and between the walls of the two bowels there was about a gallon of pus.

A. LIAUTARD.

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THE LIFE HISTORY OF GONGYLONEMA SCUTATUM. Brayton H. Ransom and Maurice C. Hall. *Journ. Parasitology*, v. 2 (2), pp. 80-86.—*Gongylonema scutatum* is the gullet worm of sheep and cattle, a parasite very common in these hosts in the United States and resembling a thread sewed in serpentine fashion in the mucosa of the esophagus. It has been found that the eggs produced by the female worms in the gullet pass out in the manure and are there ingested by the small dung beetles of the genera *Aphodius* and *Onthophagus*, either while the beetles are in larval stages or when adult. The larvae from these eggs develop in the beetles to an infective stage and the beetles are ingested by sheep and cattle in grazing over fields where these insects are making their flights from one manure deposit to another. As the beetles land on grass or other vegetation and start to crawl toward a manure deposit, the vegetation through which they are traveling may at that moment be eaten by sheep or cattle and it is a matter of common knowledge that these animals do not stop to sort out such miscellaneous objects from their food. The nature of this life history has been demonstrated by feeding dung beetles and the *Gongylonema* larvae, which are of fairly common occurrence in these beetles, to experiment

sheep, and the subsequent demonstration of the adult worms in the sheep. It has also been shown that the larvae will develop in the croton bug and that larvae developed in this intermediate host will infect sheep when fed to them.

In this connection, attention is called to the work of Fibiger and Ditlevsen who have found a similar worm, which they call *Gongylonema neoplasticum*, in rats, and which appears to be communicable to rodents generally. *G. neoplasticum* occurs in the squamous-celled epithelium of the anterior portion of the digestive tract, including the mouth, tongue, esophagus, and fundus of the stomach. In these regions the worm gives rise to a proliferation of the epithelial elements, originating as a circumscribed or diffuse hypertrophy with a slight inflammation, going on to the formation of papilloma, and terminating in distinct carcinoma with occasional metastases. This parasite has its intermediate stages in croton bugs, cockroaches, and mealworms. The fact that it bears some etiological relation to the production of cancer is a fact of considerable scientific and medical interest.

It is also noted that the worm commonly known as *Spiroptera obtusa* from the stomach (the authors have inadvertently stated that this worm occurs in the intestine) of rats, mice, and other rodents, has a somewhat similar life history, the larvae developing in the mealworm. The feces of the rodents parasitized by these worms are eaten by mealworms and the mealworms in turn eaten by the rodents.

M. C. HALL.

—O—

TREATMENT OF MANGE IN ARMY HORSES. Prof. Coquot. *Bullet. de la Soc. Cent.*—Having a large number of mangy army horses to prescribe for, they were divided and classified according to the condition of the disease, into three groups: 1—those where the mange was isolated; 2—those where it was well localized; and 3—those where it was general, that is covering a great surface of the body. The three groups were kept separated and out of doors night and day. All the animals had first a free soaping followed by energetic brushing, until the skin was cracking and blood oozing. An exposure to the sun with walking dried the animal which was then ready for the anti-parasitic application.

To those of the first group the treatment consisted in washing with sulfurous solution and the application of Helmerie ointment.

To those of the second group, the same washing, the applica-

tion of an ointment made of oil, petroleum, benzine in equal parts to which were added soft green soap and sublimed sulphur also in equal parts and sufficient in quantity to make a soft paste. The application dried rapidly on the surface and was left for two days when a general washing removed it.

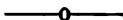
The same treatment was also applied for the animals of the third group. Half of the body being treated first and the other later.

Recovery was obtained rapidly in nine-tenths of the cases. An average of from 10 to 20 days being required to obtain it.



TUBERCULAR MENINGITIS IN A COW. J. Bourwan. *Vet. News.* The cow was six years old and had a calf 18 months before, coughed only lately. She had been alternately dull and excitable. For eight days she had been standing with the head elevated and carried rather on one side. She ate some, swallowed easily and gave a small quantity of milk. Such was her previous history.

She was emaciated, lay on her bent knees and was unable to rise. The head was elevated and carried on one side, the eye-balls were in an oblique position, there was no nystagmus, the cow had now and then clonic convulsions in the limbs and she was very excited. The next day she was stretched out full length, the head still in the same condition, clonic convulsions were very frequent. She died in the evening. At the post-mortem, the diagnosis of tubercular meningitis was confirmed. The pia mater at the base of the brain and of the hemispheres was infiltrated and presented a compact mass of tubercles about the size of a millet seed. In examining the thoracic cavity the peribronchial and mediastinal lymphatic glands were found the seat of calcified centers and some of them with purulent foci.



AMPUTATION OF PROLAPSUS RECTI IN A PONY. Dr. A. A. Feist. *Alpha Psi Bullet., Vol. I, No. 4.*—The case was well characterized, reduction had failed and a very grave prognosis was offered. Amputation was the only chance of saving the animal. It was performed as follows:

The colt was narcotized with the injection of 20 minims of fluid extract of cannabis indica intravenously. Chloride of adrenalin was injected in the tissues at the seat of operation. The colt was secured, the seat of operation rendered aseptic as much as

possible with solution of kresol, and two hat pins were introduced at right angles to each other at the base of the protruding rectum. A half ounce hard rubber syringe was introduced into the rectum up to the point where the bowel was to be ligated. This was done to support the inner wall of the protruding part and making the ligation more effective and the suturing easier. The part ligated, a circular incision was made two and one-half inches from the base. After the portrusion was removed, four sutures were placed in the ends of the bowel, at even distance and four more were placed between these. Silk sutures were used. The ligatures were gradually released and the hat pins removed. A truss was placed immediately, in the shape of a figure 8 running round the body and neck and back under the tail. Local treatment with rectal injections of kresol, careful diet and later tonics brought a complete recovery in two months.

A. LIAUTARD.

ANTHRAX FROM SHAVING BRUSHES. Some time ago, in London, several cases of anthrax were traced to infection from shaving brushes. Investigation disclosed that a consignment of brushes belonging to the same lot had been sent to Glasgow. By direction of Dr. A. K. Chalmers, Medical Officer of Health of the City of Glasgow, this lot was promptly secured and withdrawn from sale as far as possible. The lot numbered 324 shaving brushes, and of these 280 were collected and examined. According to a letter just received from Doctor Chalmers, "the bacillus of anthrax was isolated from the hair taken from a group of ten brushes (in two boxes) which had reached the shop of a retailer. The bacillus was found to possess the degree of virulence which it ordinarily exhibited on isolation from cases of anthrax.

These findings are of extreme interest and indicate a source of infection of anthrax which should not be overlooked. Some months ago, the Department of Health examined brushes on the market, and found no anthrax in any of them. Moreover, it was learned that the method of manufacture, as at present carried on in this city, precluded the probability of any infection from this source.—*Weekly Bulletin of the Department of Health, City of New York.*

PROCEEDINGS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

(Continued from page 133)

PRESIDENT MARSHALL: I would be very glad to have somebody make a definite recommendation along this line.

DR. HOSKINS: Mr. Chairman, I am prepared to make one if no one else is and that is, that a committee composed of five members be selected to be known as the Salmon Memorial Committee and that they shall be appointed for a period of five years. In the event of death or resignation of any member of that committee, of course the president would have the power to fill any such vacancy.

PRESIDENT MARSHALL: That they be appointed by the incoming president?

DR. HOSKINS: I leave that entirely as a matter for the association. The incoming president or the present president, whichever is decided. Seconded by Dr. Schneider.

PRESIDENT MARSHALL: The motion has been made and seconded that a committee of five to be known as the Salmon Memorial Committee be appointed to serve for five years.

DR. HOSKINS: To be appointed by the present president.

PRESIDENT MARSHALL: I didn't understand that was included in the motion.

DR. KINSLEY: Make a permanent committee rather than a five year committee, having one new man appointed each year.

DR. DUNPHY: I have a suggestion to offer in regard to this matter, in order to keep that committee and to continue it, that we appoint a committee of five to serve three years. At the end of three years, let a member of the committee retire each year, and another member of the committee be elected in his place, that would keep a permanent working committee, familiar with the conditions all the time. It would be possible to appoint a committee of five to serve for five years and it would be possible at the end of that time to have an entirely new committee. I believe if we carry that committee for three years and at the end of three years, let one or two retire, one for instance and each year fill the place with a new man, either to be reappointed or selected, that this would give the committee a certain amount of permanency and would not make a radical change.

DR. KINSLEY: Mr. President, I move as an amendment to the original motion that this committee be a permanent committee of five, the term of one to terminate in one year, two years and so on down so that one man could be appointed each year.

DR. FAUST: Mr. President, that would mean one man is appointed for five years, one for four years, one for three years, one for two years and one for one year and each year there is a new man on the committee. I second that amendment,

DR. HOSKINS: Mr. Chairman, I accept that amendment. I think Dr. Kinsley's suggestion is a good one. One member for one year, one for two years, one for three years, one for four years, and one for five years, which gives the in-coming president an opportunity to re-appoint the retiring member if all members of the committee have fulfilled their duty.

DR. H. C. MCCAIN: The point was not settled in the motion of Dr. Hoskins as to whether or not the present president or the in-coming president would appoint the committee to start with. Speaking on that subject, I would be strongly in favor of the in-coming president appointing that committee, giving him the same opportunity as each succeeding in-coming president would have. In Dr. Hoskins' original motion, it was not stated which president would appoint the committee.

DR. KINSLEY: I think we had better dispose of the organization of the committee first and then appoint them afterwards.

DR. DANIELSON: In that this is a committee lasting for five years with five members in rotating appointment or selection, I suggest as an amendment to this motion that the present president appoint three members of this committee and the in-coming president the remaining two members. I really think that the selection should not be entirely left to one man. It is a committee of lasting endurance and importance and I think both the out-going and in-coming president would be willing and I think that the association would be willing to see them divide the responsibility of the selection of that committee.

PRESIDENT MARSHALL: Is not that suggestion out of order just at present? What we want to do now is to select the committee as suggested in the motion and then later say who is going to make the appointment.

DR. DANIELSON: I thought there was a doubt in our minds about it.

PRESIDENT MARSHALL: This is an open question to be decided by this body later. With that understanding, gentlemen, are you ready for the question? All in favor of having the committee appointed, as Dr. Kinsley put it, signify by saying "aye", opposed the same. The "ayes" have it; it is so ordered. Now we would like to hear how this committee shall be appointed and by whom it shall be appointed.

DR. DUNPHY: In view of the fact that this is an important matter and there will be a member of this committee elected every year, I move that the association select this committee. Seconded by Dr. Faust.

PRESIDENT MARSHALL: It has been moved and seconded that the committee be selected by the association. Any remarks?

DR. MCCAIN: Mr. President, I rise for information. If there were only five men elected, which one would serve five years and which one year?

PRESIDENT MARSHALL: The one receiving the largest number of votes would serve for five years, the next largest for four years, and so on. How would that do?

DR. NEWSOM: I cannot say that I fully approve of that suggestion. There are a number of younger men here, men who are younger in the association than myself and I would not feel competent to vote upon the names to be

presented for that committee. I feel sure that many of these older men who knew Dr. Salmon well and the men who were intimately associated with him would be much better prepared to select that committee, than this body alone. I would offer as an amendment to this motion, that we vote upon the names as recommended by the executive committee.

DR. FOX: Mr. President, it seems to me we are taking a large job on our hands and that it is unnecessary to vote on four or five men to act as a committee. Suppose we take the presidents for the last five years—and let them constitute this committee. At the end of each year, let our retiring president take the place of the one who would drop out. There would be no appointment, they would be elected by the association. When they elect a president they know he will take the place of the president that retired five years ago. Make that a continuous committee along that line, the last five presidents acting on the committee.

DR. RUTHERFORD: The serious objection to that is, that it leaves out Dr. Hoskins.

DR. FOX: I beg Dr. Hoskins' pardon, I had not considered that. I will withdraw that suggestion.

DR. HOSKINS: I am not taking that matter into consideration but there is one man who ought to be on that committee and that is Dr. Melvin, who has taken a great deal of interest in the matter and that great body of men in the Bureau, the employees of the Bureau of Animal Industry are deeply interested and Dr. Walkley has taken a deep interest and is ready to move whenever we say what direction the movement shall take.

We ought also to have a man from Canada. I am willing to work in the ranks. I don't wish to be on the committee at all. I will take as much interest working in the ranks as though I were a member of the committee but I will act upon the committee if it is the pleasure of the association.

DR. NEWSOM: I think what has been said only bears out the statement I made a while ago, that this body is not capable of selecting this committee, and I think that any of the other ways suggested would be better, either the in-coming or the present president, should appoint this committee. I move as a substitute for all pending motions, that the in-coming president appoint this committee just as he would all other committees of the association. Seconded by Dr. R. C. Moore.

DR. DUNPHY: If this association is not capable of appointing proper members for the committee, how should they expect the selection to be made by the president? If this association is not capable of electing a committee for that purpose, they certainly should not have a voice in the choice of electing a president.

DR. R. C. MOORE: Mr. President, the point is to select the men best capable of doing the work and I have to differ with Dr. Dunphy on this question. We are capable as far as that is concerned but have we time to consider who are the men best adapted for this particular kind of work? I don't believe we are sufficiently acquainted with the personnel of this association for this purpose. I believe that the president is the man who should appoint this committee and therefore, I want to second Dr. Newsom's motion,

PRESIDENT MARSHALL: I think it will be necessary to put Dr. Newsom's question. It was a substitute for the original motion.

DR. MURPHEY: I would like to rise to a point of order. I do not think a substitute motion of this kind is in order.

DR. NEWSOM: I am satisfied that a substitute motion bearing on the question at issue is always in order and I feel that the motion should be voted upon.

DR. RUTHERFORD: Speaking of a point of order, Mr. President, I would say, a substitute motion is in order but if anyone offers an objection, it is not in order.

DR. MURPHEY: Mr. President, I object to the point of order.

DR. HOSKINS: Mr. President, there ought not to be any great discussion about the constitution of this committee. It is a committee, as has been said by some of us here, which ought to be selected with the greatest possible care, as to the influences the men may wield in doing this work. Dr. Melvin, who is the chief of the Bureau of Animal Industry would be a valuable member of this committee. We want somebody from Canada, either my good friend Dr. Rutherford, or Dr. Torrance; men who are in touch with the profession, then we would want Dr. Walkley, one of the Bureau of Animal Industry and then we would want two or three others, who would represent geographic places of our association in the United States, in order that the work may be carried on in the most judicious manner. Might it not be well to leave this also to the joint consideration of the out-going and the incoming president?

DR. MAYO: Mr. President, I want to say that I know that the present president has given very careful consideration to the selection of men for the various committees that he has filled. Men who would work to the best advantage of the association. I believe that our in-coming president will do the same.

DR. SIMMS: Mr. Chairman, I would corroborate what Dr. Newsom has said in regard to Dr. Dunphy's remarks, in reference to the election of a president. I feel that I am capable of voting for a president, but I do not feel that I know the personnel of the association well enough to know who was associated with Dr. Salmon, ten or twelve years ago when he left the Bureau. Therefore, I am opposed to the motion before the House.

DR. HUGHES: The thought has occurred to me as to whether it might not be well by looking over those assembled here to check over in one's mind a certain number who were closely associated with Dr. Salmon. Here on my left is Dr Meyer, also Dr. Hoskins and Dr. Rutherford and I see several others. Why not appoint a committee of those old timers. They knew more about Dr. Salmon than we. I would suggest appointing three men as a nominating committee and let them report back to this association. I make an amendment to the motion to that effect.

PRESIDENT MARSHALL: Gentlemen, you have heard the motion. Did anybody second it? The amendment is made by Dr. Hughes that a nominating committee of three be appointed. Seconded by Dr. Fox.

DR. DUNPHY: Mr. President, I would be willing to accept Dr. Hughes' amendment to my own motion provided my seconder will accept this.

DR. FAUST: I seconded the motion that the association should select the five members.

PRESIDENT MARSHALL: Are you willing to accept the amendment that a nominating committee of three be appointed to select the committee?

DR. FAUST: Yes.

PRESIDENT MARSHALL: The amendment has been accepted by the original mover and seconded. Now you have heard the proposition that a nominating committee of three be selected by the president and that they offer the names of five men to be selected by the association. Any remarks?

DR. KINSLEY: Is this going to simplify matters after all? I cannot see that we are gaining much.

DR. MURPHEY: It seems to me that we are on the right track. A nominating committee chosen by the president, composed of men who are able to judge of the personnel of this committee, is the very best way to handle it. Two things must be considered in selecting this committee. First, the kind of men to be appointed and their location with respect to their ability to meet with the other members and take active part in carrying out the work. A good many men no doubt would be highly valuable on this committee who cannot spend the money to come a long distance to attend to the business of it.

PRESIDENT MARSHALL: All those in favor of the motion as amended, signify by saying, "aye", opposed "no". The "ayes" have it; it is so ordered.

DR. LOCKETT: I move that the nominating committee be appointed now and that the election take place at the afternoon session. Seconded by Dr. Fox.

PRESIDENT MARSHALL: It has been moved and seconded that the nominating committee be appointed now and that the election of the committee be held at the afternoon session. All those in favor of the motion, signify by saying, "aye", those opposed "no". The "ayes" have it and it is so ordered. If you will give me a few minutes to think it over, I will appoint the committee. The secretary is present now and desires to make a report of the executive committee.

DR. HUGHES: Mr. Chairman, I rise to a question of information. I would like to know definitely as to when the election of officers will come up today.

PRESIDENT MARSHALL: I am glad you brought that question up. Several members suggested we hold the election at four o'clock this afternoon after the Symposium on Influenza, that is the only thing which we have on the program for this afternoon. Some members want to go home, some want to go to the Fair and do other things and do not like to be required to attend this evening session. Now if we change the election to four o'clock it will take unanimous consent to accomplish it. I want you to think that over. I will ask you to vote on it now if you are prepared to do so.

DR. HUGHES: I would like to know whether the time is specifically set in our constitution and by-laws.

PRESIDENT MARSHALL: No, not in the constitution and by-laws.

DR. HUGHES: Who is it then that regulates this time, is it not the association?

PRESIDENT MARSHALL: It was printed in the program that the election of officers would take place this evening.

DR. MAYO: The constitution and by-laws gives the order of business as follows: First, roll call, second, submission of the minutes of the previous meeting as presented in the annual report and other records kept by the secretary, etc.; it is not necessary for me to read them all but after the reading of papers and discussions, follows the election of officers, installation of officers, adjournment. In the official program, I did not put this in because it is provided for in the constitution and by-laws. The arrangement made on the local program is to have the election of officers the last thing before adjournment because it is regularly provided for as the last official business of the general organization, except the installation and adjournment.

PRESIDENT MARSHALL: I do not understand that the order of business refers to the whole meeting but to the regular sessions as we have them and we follow that plan and order of business for the day. I talked to some members and they consider the order of business for the whole meeting, the four day meeting is the one to follow.

DR. HUGHES: I move that the election occur this afternoon at two o'clock instead of at seven-thirty this evening. Is there objection to this?

PRESIDENT MARSHALL: Yes, probably you have overlooked the symposium scheduled for two o'clock. That is not a general meeting. It is a symposium of the two sections. I think we might call a general session for the election at four o'clock after the session is finished.

DR. HOSKINS: I accept that as an amendment.

PRESIDENT MARSHALL: Would that be acceptable to you, Dr. Hughes?

DR. HUGHES: I accept the change.

DR. RUTHERFORD: I beg to move that the election of officers be held as set forth in the program. I know a number of men who are not here this morning and who won't be here this afternoon, who are not particularly interested in any of the work going on today but who are under the impression that the election will be held this evening as set forth in the printed program, and have made their arrangements accordingly, and are expecting to be here and take part in the election. I think it is a dangerous precedent indeed to move forward an election. If a man misses a paper or discussion, he gets over it, he can read it later but in the matter of missing an election, which has been scheduled for a certain time and which has afterwards been set forward, that is a very different matter. He is apt to feel that he is being the victim of some sort of a plan to deprive him of his rights without due notice and warning. If you were setting the election back a few hours, it would not matter so much but to move it forward, is a very dangerous custom to establish. I question very seriously the advisability of making a change and therefore, I move that the program stand as set forth.

PRESIDENT MARSHALL: I think under the rules that if anybody objects to advancing the election, it is not permissible. We will have the election to-night at seven-thirty. Dr. Rutherford will now read his report on the International Tuberculosis Commission.

President of the American Veterinary Medical Association.

Sir:

We beg to present the report of the International Commission on Bovine Tuberculosis, covering the period since the last meeting of the association. The commission has not met during the intervening period, owing to the fact that it scarcely appeared worth while to call the members together in view of the comparatively small amount of work which, under existing circumstances, they could have performed.

The commission has felt that its principal duty was performed when in 1910 it presented to the association the comprehensive report which has since been published and widely distributed throughout both the United States and Canada.

For some time, the members have been considering the question of the advisability of continuing or discontinuing the commission. The general consensus of opinion among the members is that it will be in the best interests of all concerned to perpetuate the commission with such changes in its personnel as the association may deem advisable.

While as has already been stated, nothing of outstanding importance has presented itself in connection with either the pathology or the general control of bovine tuberculosis, there are one or two matters which it is felt should, from this time on, receive consideration at the hands of the commission. Among these, perhaps the most important is the securing of satisfactory and comprehensive evidence as to the reliability of the various new methods of using tuberculin as a diagnostic agent and it is felt that the evidence so far available in this regard is somewhat conflicting, and that it should be the duty of the commission to satisfy itself upon the subject and make a public pronouncement in accordance with its findings.

A number of the members have attended comparatively few of the meetings of the commission and it is felt that, in view of this and other circumstances, it will be advisable to make some changes in the personnel of that body and also to make a numerical reduction in the membership.

Without going into details, we beg to recommend in this connection that, subject to the approval of the association, the names of the following gentlemen: Messrs. J. W. Flavelle, L.L.D.; Charles A. Hodgetts, M.D.; and J. N. Hurty, M.D. be dropped from the list of members, that the Hon. W. D. Hoard and Hon. W. C. Edwards be continued as honorary members, and that the following gentlemen be added to the working membership of the commission: Mr. John R. Valentine, of Pennsylvania; J. H. Grisdale, Director, Experimental Farms of the Dominion of Canada; Dr. F. S. Tolmie, of Victoria, B. C.

Respectfully Submitted,

J. G. Rutherford, J. R. Mohler, V. A. Moore, F. Torrance.

September 1st, 1915.

In explanation of the foregoing suggestions, I would say that Messrs. Flavelle and Hurty, have both asked that they be relieved from service on the commission and as neither of them have shown any special interest in the work, I do not think their wishes in that connection should be disregarded. Dr. Hodgetts is now at the front; Mr. Hoard is now seventy-nine years of age and asks to be relieved on account of physical disability. Mr. W. C. Edwards, though not so old, is now in a similar position. As to the additional members, I might say, Dr. Tolmie, of British Columbia, has been for some years, president of the Provincial Agricultural Society. He is a man who has a very great and wide influence. I might say that this report is signed by Dr. Mohler, Dr. V. A. Moore, Dr. Torrance, and myself. We being the four members of the commission present, and we feel in view of the work which has been done officially by the British Columbia Government in the endeavor to stamp out tuberculosis in that province, that it ought to be recognized in that way by the addition of Dr. Tolmie on that commission. I think most of you are familiar with the names of the other members of that commission. It is very fairly well balanced up. Representing the veterinary profession in the United States, we have Dr. Mohler, Dr. V. A. Moore, Dr. Reynolds, and Dr. Ravenel and Dr. Schroeder from the Experiment Station at Bethesda, Md., and representing the profession in the west, we have Mr. Tomlinson, Secretary of the Live Stock Association and today giving the veterinary profession very valuable support in connection with this work, together with the work generally of stamping out and controlling contagious diseases among animals in the United States. We have also Mr. Ferguson, who is Secretary of the United States Sanitary Board. In Canada, we have Dr. Torrance and myself, as well as Dr. Tolmie. So that with the addition of Mr. Grisdale and Mr. Valentine, it leaves four members in Canada and six in the United States. Of course we have no desire to dictate in any way to the association, either as to whether or not this commission shall be continued or who its members shall be. We are simply giving this as a suggestion in view of the fact, that having been associated with the work now for some six years, we feel that perhaps we understand the exact situation better than otherwise would be the case.

DR. NEWSOM: Mr. President, I move the adoption of the report. Seconded by Dr. R. C. Moore.

DR. STANGE: I would like to amend the motion that we not only receive the report but accept the recommendation.

PRESIDENT MARSHALL: Do you accept the amendment?

DR. NEWSOM: Yes.

PRESIDENT MARSHALL: The amendment has been accepted by the mover and seconder that we not only accept the report of the committee but that we approve it. Any remarks?

DR. EAGLE: I would like to ask, are we taking a veterinarian off that commission in order to place the name of John R. Valentine on it? If so, I would like to ask if he is the Valentine who is connected with the Armour Packing Company.

PRESIDENT MARSHALL: I think I can explain Mr. Valentine's position. He is a gentleman farmer near Philadelphia. He has a large herd of Ayrshire cattle and has done good work in keeping disease out.

I suggested Mr. Valentine's name myself. I have been familiar with Mr. Valentine's work for a number of years and he has assisted us in every way possible to get laws and regulations for the handling and controlling of disease. He has been a most intelligent layman.

DR. EAGLE: I asked if he is the man who is connected with the Armour interests.

PRESIDENT MARSHALL: No, he is a gentleman farmer and has no connection with the Armours or any one else.

DR. HUGHES: The gentleman to whom Dr. Eagle no doubt refers as connected with the Armour Packing Company, is D. A. Valentine.

PRESIDENT MARSHALL: You over-looked the question in reference to whether he is replacing a veterinarian on the commission.

DR. RUTHERFORD: No, he replaces the Hon. W. D. Hoard, who becomes an honorary member.

PRESIDENT MARSHALL: Any other question or remarks? If not, all those in favor of the motion and adopting the report as suggested by Dr. Stange, say "yes", opposed "no". The "ayes" have it; it is so ordered.

The next order of business is the report of the executive committee.

DR. MAYO: Mr. President, it was moved that the president of the association be authorized to appoint delegates to attend conventions of other associations having a similar interest when in his judgment it would promote the welfare of this association. I would say in this connection that a member of the association frequently requests the president to appoint delegates. It is understood that they are to go at their own expense and that there will be no expense charged to the association in order to attend these conventions, for instance, cattlemen's convention, pharmaceutical associations and other similar bodies, the president has assumed that authority in the past and this action on the part of the executive committee merely gives the authority of the association to do that so that the delegates so appointed will be properly accredited.

DR. KINSLEY: I move that the recommendation be adopted. Seconded.

PRESIDENT MARSHALL: All those in favor of the motion signify by saying "aye", opposed "no"; it is carried, the "ayes" have it.

DR. MAYO: Invitations have been received to hold the next convention at the following places: Baltimore, Cincinnati, St. Louis, Columbus, Boston, Detroit, Kansas City, and some other cities. It is moved to refer these invitations to the in-coming executive committee.

PRESIDENT MARSHALL: I would like to add the name of Philadelphia to that list if it is not too late.

DR. MAYO: I said several other cities.

PRESIDENT MARSHALL: If there are no objections the name of Philadelphia will be added as suggested.

DR. MAYO: It is recommended that the President of the association appoint a committee of three to consider and report upon an emblem for the association to report at the next meeting.

DR. HOSKINS: I move that the recommendation be approved. Seconded by Dr. Fox.

PRESIDENT MARSHALL: It has been moved and seconded that the president of this association appoint a committee of three to consider and report upon an emblem for the association. All those in favor of the motion, signify by saying "aye", opposed "no". The "ayes" have it; it is so ordered.

DR. MAYO: Proposed amendment to the constitution and by-laws. Resolution by Dr. Baker.

"Whereas the renting of a hall has been left to the local committee at the place at which the meeting has been held and the expense thereof has been in the past borne by the local committee, be it

"Resolved, that the expense of such hall in the future be paid by the American Veterinary Medical Association."

DR. KINSLEY: I move that the recommendation be adopted. Seconded by Dr. Newsom.

PRESIDENT MARSHALL: Any remarks? If there is no objection, it is so ordered.

DR. LYMAN: That is an amendment to the by-laws?

DR. MAYO: Yes, it has been on file two years. The resolution was presented by Dr. Baker at the annual meeting.

"Resolved, that the annual dues of this association be raised from three to five dollars a year."

It is recommended that the proposed amendment be rejected.

DR. KINSLEY: I move that the recommendation be adopted. Seconded by Dr. Hughes.

PRESIDENT MARSHALL: Any remarks.

DR. MURPHEY: In view of the action of the association in taking on a new Journal and possibly one or two things that may come up later, I think that we ought to raise the assessment to five dollars and not have the officers

embarrassed to the extent they have been in the past to secure sums for the publication of a Journal and to do the other necessary business of the association. I think it detracts from the dignity of the association to have this embarrassment over lack of funds.

DR. KINSLEY: The committee has not reported on the Journal but I suspect from this action they expect the Journal to be paid for in addition to these dues. Is that right, Mr. President?

PRESIDENT MARSHALL: You are wrong.

DR. KINSLEY: Does the price of three dollars include the price of the Journal also?

PRESIDENT MARSHALL: I understand so.

DR. HUGHES: As I understand the matter, gentlemen, our treasury is in an absolutely impoverished condition. The other day at a little meeting of the faculties we were informed that we are indebted to a number of veterinarians of various places, who have advanced money in order to carry on the work of the faculties and examining boards and having a little dislike for debts of any kind, we naturally looked around to see how we could get hold of one hundred and four dollars in order to pay what we owed. We could not decide as to how that should be done. It is true we chipped in a little money and got about thirty dollars. Then the suggestion was made that we could make a request of the executive committee to come to our aid. I don't know what the executive committee has done about it but this hand to mouth business is a poor method to say the least. We should surely have a little balance to our credit. As it is now, we are running on credit. It seems to me that none of us will suffer by this little matter of raising the dues from three to five dollars, while at the same time, it will put the association on a business basis.

DR. STANGE: Mr. Chairman, is there not a provision in our by-laws for special assessments? If there is indebtedness and if it is necessary to raise more money, a special assessment for one year for the additional expense to take care of the starting of the Journal, could be very easily accomplished and then when the Journal was put upon a paying basis, we would be back on our old basis of three dollars a year for dues. I think there is a feeling that after this Journal is started the expense of carrying on the association would not be as much as it is now. It seems to me the special assessment plan would be a much better one than to raise the dues to five dollars on a permanent basis.

DR. ELLIS: In many of the organizations to which I belong, we are paying much more than five dollars a year and getting a very small return in comparison with what we get from this organization. I think we ought to make that little change to five dollars. It is not much compared with the benefits we get from an organization of this kind. If you find you have too much money in the future, you can easily go back but it seems to me from the condition of the treasury as has been reported for the last two years that two dollars a head additional would fill up the gap and put the association in very fine shape for the present.

Furthermore, I do not think the members will miss the money.

DR. HOSKINS: I hope you will reject the recommendation of the executive committee. The measure of usefulness of an association is always of course, evidenced by an empty treasury and we have had practically an empty treasury for two years. On one of the committees of which I was chairman, for which the association had been good enough to appropriate money, I could not get the money and did not get the balance of it until a few weeks ago because there was no money in the treasury. I did not let the work drop because of lack of funds but I found it necessary to raise the money myself. We ought to be doing a great deal more work than we are doing. There is work waiting for us everywhere but there is a lack of means to do it. We could not get enough out of the association in 1913 to give extra copies of the report to the association faculties and examining boards in order that we might send a copy of what we had done to the various members of the boards, which is changed all the time. For more than twenty years the fee of this association was five dollars. In my opinion, it ought never to have been reduced because it curtailed our work from time to time. When we send a book to every member, costing from two to two-fifty, which is the actual cost, leaving nothing but the initiation fee and the balance of the annual dues for work, you can readily see we are just simply eliminating the work that ought to be done and is waiting to be done. We are two thousand or more in membership now and those two thousand men are able and willing to increase the amount of the fee in order to put the association on the proper financial basis and give it funds for the carrying out of the wishes of the association. I trust you will reject this recommendation of the executive committee and adopt the one making the dues five dollars a year.

DR. JENSEN: I desire to make it clear I am not speaking from any personal motive because I assure you I am able and will be delighted to pay the five dollars a year but I fear some of our members are not in my position and as much as a man might feel an inclination to do his duty in this matter, if he has not the finances, it is impossible for him to pay the additional money. Our secretary tells me that even at the present time, he finds it quite difficult to collect the dues. If I had any degree of assurance that the general membership would take kindly to the raising of the dues, I would say, amen, let us make it five dollars; but suppose we raised the dues and this might result in the loss of a great many members. Would it pay? I would like to add to this that the annual cost of the publication of the proceedings of this meeting has been very large. In fact, I think the last issue cost something like four thousand dollars. It is proposed to publish a Journal and we have it figured out pretty well, that this Journal, within a reasonable length of time will be absolutely self-sustaining. Thus, taking the burden off the association of four thousand dollars a year. I want you to understand, gentlemen, I am not objecting to the two dollar raise personally. I think we ought to look at things from the viewpoint of the membership. I feel it may be detrimental to the association if we raise the fee to five dollars.

DR. FAUST: Mr. President, in looking over the treasurer's report, I noted there was a balance of one thousand dollars to carry on next year's expenses and there were three thousand and some odd dollars left two years ago and

out of that the expense of two years has been paid. If we had to publish the proceedings of last year, we would have been about three thousand dollars in debt, and if we kept on in this way, we would certainly come to disaster.

DR. MAYO: We have nineteen hundred and sixty members and we have just taken in more than two hundred and fifty, therefore, it would make our membership a little over two thousand two hundred.

DR. FAUST: That would make the proceedings alone cost two dollars a member to print and I don't see how we could expect to get out with the three thousand dollars.

PRESIDENT MARSHALL: There will be a Journal next year.

DR. TYLER: In view of the added obligations which this association has assumed, it seems to me wise to increase the annual dues. We have established by the action of this association a Journal to publish the reports and so on. There is a remote possibility as I understand it that this Journal may not be self-sustaining, but even if that is so, if these members are receiving their value received by this increase, what difference would that make? If there was a new Journal established they would receive that Journal practically for the two dollars additional. It surely will be worth two dollars a year. If this association or the committee appointed should conclude to assume control and take over one of the existing Journals, (I don't know that that is true,) but in case they should, they would take over the Review, which is three dollars a year or the Chicago Journal which is two dollars. In view of the fact that most of our members are taking one or both of these papers, the increase of the dues to five dollars would really be a saving to us in the end, because we would save the price of one or both of the Journals. If the Review should be taken over by us and we increase the dues to \$5.00, it is an increase of \$2.00. We, in turn make a saving of \$3.00 because if you do not take the Review, you ought to. There is a net profit to each member and I don't see how this association stands to lose anything by raising these dues two dollars more.

The members are bound to get value received either in a new Journal or in an old established Journal because the minute we take it over we discontinue our subscription to Dr. Ellis.

DR. SCHULTZ: I am one of those who only occasionally am able to attend your meetings but personally, I think a book containing the proceedings is well worth three dollars to anybody out in the field because it is a representative publication containing the articles that have been sifted through and are written in an unbiased manner; therefore, you give me equal value in the three dollar book when I pay the three dollars. No business proposition can advance nowadays unless it has money because we wish to live better today than we did twenty years ago, so I am in favor of raising the dues and I can assure you that the men in the field will read the Journal. It is well worth the two dollars a year. If you are going to add a Journal, I think five dollars' is not too much. Five dollars is nothing. Raise the dues so that your association will have more means and will be on a better business basis and therefore increase its efficiency to delight its members who are out in the wilderness.

DR. MAYO: I would like to explain to you, the situation as shown by the treasurer's report. On the first of August I turned over, as secretary, all the dues in my hands to the treasurer and his report shows that when he closed his books there was eleven hundred dollars in the treasury. There were also probably bills that had not been paid already in his hands amounting to about five hundred dollars. Since the first of August the statement for dues for the coming year have been sent out and I had in my hands, two thousand dollars and a little more. These are dues that have been paid for the coming year. In sending out the statements for dues for the coming year, I included an official copy of the program in which the proposed amendments to the constitution were included. Of course, a good many in sending in their dues hoped they would not increase the dues. We will lose some members by increasing the dues unquestionably. However, I feel confident we will get much more money than we will lose in membership by this change. The executive committee in reporting on this, I believe, felt, that at the present time when we were launching a new enterprise which they hoped would prove remunerative, and I believe it will, if not the first year, eventually, that it was better not to increase the dues at this time.

DR. EAGLE: Mr. President, I would like to offer a suggestion along that line. I am like Dr. Jensen. I am willing to pay that two dollars and I believe a great many members are in the same position but I believe it would be a good idea to have a vote of all members of the association on the proposition. Why couldn't we have a postal card vote on the proposition? I think it would be well to state on this postal card what they are going to receive in the way of a Journal and other inducements to increase this assessment to five dollars a year.

DR. R. C. MOORE: I believe it would be a good idea if we could postpone the consideration of this recommendation until after we hear that report. If we raise the dues now, when does this change take effect? Dr. Mayo has just told us that a good many of the members have paid their dues for the coming year. Do we go back and ask these new men to increase their dues if this change is made?

DR. MAYO: In reply to the question of Dr. Moore, I will state that if this provision carries and is passed, as I understand it, it will not take effect until a year from this first of September. The committee discussed that and it felt that if they needed money, they would need it before that time and they have authority now to levy a special assessment if it is needed. By another year we shall be in a better position to say whether the Journal will be remunerative or not. Personally, it does not make any difference to me whether you raise the dues or not. The secretary, whoever he may be, has some difficulty in collecting the three dollars dues and of course, it will increase his difficulty somewhat but not materially. I think they are going to be pretty good about paying their dues.

DR. BAKER: When the report was made that this association was hard up, it struck me that something ought to be done to relieve the financial stress. Now there are only two ways of increasing our income. One is to raise the

annual dues and the other is to levy an assessment. I am opposed on general principles to levying special assessments. I think we ought to raise the dues to where they were before they were reduced. They were originally five dollars and reduced to three, if I remember right, at my suggestion. I fathered that resolution through. That action was taken at the time when we were having very hard times when horses were comparatively worthless. Now we have got back on our feet again and the purchasing power of a dollar is much less than it was when this reduction was made to three dollars. The high cost of living makes it necessary for the association to have a little larger income than when the reduction was made so I sincerely trust that you will all vote for my resolution although with great respect for the wisdom of the executive committee, I think they have taken too narrow a view of this situation.

PRESIDENT MARSHALL: The question has been called for. Those in favor of accepting the recommendation of the executive committee —

DR. MAYO: The recommendation is Dr. Baker's resolution to amend the by-laws so that the annual dues of this association be raised from three to five dollars a year. The recommendation of the executive committee is that this resolution be rejected so that if you vote "yes" on this report of the committee, you reject the raise of dues and leave it at three dollars a year.

PRESIDENT MARSHALL: Will you accept the recommendation of the executive committee?

DR. HOSKINS: Remember gentlemen, those who vote for accepting the report of the committee and say "yes" vote to leave the dues at three dollars. If you want to raise the dues to five dollars, you want to vote "no" on this proposition, and if you want to keep the dues at three dollars vote "aye."

PRESIDENT MARSHALL: All those in favor of accepting the report of the executive committee, which means that the dues will remain at three dollars, make it manifest by saying, "aye", those opposed, "no".

I decide that the question is lost.

DR. BAKER: I move the adoption of the resolution.

DR. KINSLEY: I call for a standing vote.

PRESIDENT MARSHALL: A standing vote is called for. Those in favor of accepting the recommendation of the executive committee, will please stand. "Ayes", thirty six. Those in favor of accepting the recommendation of the executive committee, thirty-six. "Noes", forty-five.

DR. MAYO: Those voting in favor of accepting the report of the executive committee, leaving the dues at three dollars, are thirty-six. Those voting against, are forty-five.

DR. BAKER: Mr. President, I move the adoption of the resolution.

DR. KINSLEY: What does that mean? Adopt this change in the by-laws!

PRESIDENT MARSHALL: Amendment of the by-laws by raising the dues to five dollars. That is all the amendment does.

DR. BAKER: This motion is made for the purpose of making it operative.

DR. ANDERSON: I second the motion.

PRESIDENT MARSHALL: Any remarks? Those in favor of adopting the amendment, make it manifest by saying "aye", those opposed, "no". The amendment is adopted.

DR. MAYO: Another amendment to Section 5, Article 3, of the by-laws to read as follows:

"The Secretary shall receive an annual salary of seven hundred and fifty dollars and such expenditures as may be necessary at the attendance at the annual meeting following his election." It was recommended by the executive committee that the proposed amendment be not adopted.

DR. HOSKINS: I move that the recommendation of the executive committee be adopted.

DR. NEWSOM: I second the motion.

PRESIDENT MARSHALL: Gentlemen, you have heard the recommendation of the executive committee. Any remarks?

DR. KINSLEY: Please explain what that means.

DR. MAYO: It leaves the salary of the secretary as set forth under the constitution and by-laws, five hundred dollars a year and expenses to the convention for the year in which he is secretary.

DR. KINSLEY: It seems to me since you have raised the dues it is no more than right that this should be voted down and increase the secretary's salary.

DR. JENSEN: At the time this resolution was passed by the executive committee, we had voted to retain the three dollars dues and I am very much inclined to think with Dr. Kinsley that the secretary has earned the additional salary, at least he is going to have more work in collecting the dues and I think he should have the increase.

DR. HUGHES: It seems to me that the salary of the secretary is ample as it is, five hundred dollars and expenses.

PRESIDENT MARSHALL: Gentlemen, you have heard the motion to accept the recommendation of the executive committee. I wish to say in regard to the matter of expenses, the secretary has to pay all the expenses incident to the hiring of stenographers and everything in regard to the keeping of books and matters of that kind and this expense does not include the expense of the secretary's office except the purchase of stamps and all materials necessary.

DR. BAKER: It strikes me as being slightly ridiculous although perfectly natural, that when you increase your income you naturally increase your desires and increase your appropriations. I hardly think it is proper or exactly right that in the face of this increase in income you immediately jump up and increase the appropriation against the income, but that is human nature the world over. It is a question in my mind if the secretary is not sufficiently paid now. We do not want to have the secretary's office so lucrative that every one in the association will want it. I do not think it is in the mind of any man here that the secretary will be sufficiently paid for the work he does. It is a very onerous office. At the same time he is working philanthropically and magnanimously for the benefit of the association. Five hundred dollars is of course, little compensation for the amount of work which he necessarily must do.

DR. MURPHEY: I call for the question.

PRESIDENT MARSHALL: The question has been called upon the recommendation of the executive committee. If you are to accept the recommendation of the executive committee the secretary will get five hundred dollars, if you reject it, you have got something else to do. All those in favor of accepting the recommendation of the executive committee, make it manifest by saying, "aye", those opposed, "no." Division. The president is undecided and calls for a standing vote. All those in favor of accepting the recommendation of the executive committee, will please stand. Those who are opposed stand. Voting for the recommendation of the executive committee, forty-five. Against, twenty. The recommendation of the executive committee is sustained.

DR. MAYO: I have another recommendation of the executive committee, that in view of the fact that the Ontario Veterinary College has permitted an examination by the committee of this association, it is recommended that it be added to the accredited list of colleges recommended by this association and that the graduates for the year 1914 and 1915 be eligible to membership.

DR. KINSLEY: I move the acceptance of the recommendation. Seconded by Dr. Hughes.

PRESIDENT MARSHALL: Gentlemen, you have heard the recommendation of the committee on the motion. All those in favor of accepting the recommendation, signify by saying "aye", opposed, "no." It is unanimously accepted.

DR. MAYO: I wish to state that this committee also recommends as eligible to membership, those graduates in the past two years who have not been eligible heretofore so that if anyone asks you, you will know. The following recent graduates of the Ontario Veterinary College whose applications have been recommended for membership are now eligible: Dr. E. R. Zimmerman, W. A. Troutman, also the application to membership of Dr. E. E. Patterson of Detroit, graduate of the Detroit Veterinary College of 1901.

PRESIDENT MARSHALL: I would like to state that these applications were received in time but could not be acted upon until the recommendation was passed.

DR. KINSLEY: I move that the rules be suspended and that the secretary be instructed to cast the ballot in favor of admitting to membership the gentlemen whose names have just been read.

PRESIDENT MARSHALL: Gentlemen, you have heard the motion. All in favor of admitting these gentlemen to membership, please signify by saying "aye", those opposed "no". It is carried.

DR. MAYO: According to instructions, I hereby cast the ballots of the association in favor of Drs. Zimmerman, Troutman, and Patterson, for membership in this association.

PRESIDENT MARSHALL: I declare them elected.

DR. MAYO: The executive committee recommends that Dr. Vallee, director of the Veterinary College at Alfort, France, Dr. W. A. Evans of Chicago, Illinois, and Dr. E. Wallis Hoare, F.R.C.V.S. of Cork, Ireland, be recommended for honorary membership in this association.

DR. HOSKINS: I move that the recommendation of the executive committee be accepted. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: It has been moved and seconded that the recommendation of the executive committee that Dr. Vallee, Dr. Evans and Dr. Hoare be elected to honorary membership in this association, be accepted. Any remarks? All those in favor of adopting the recommendation of the committee and of electing these men to honorary membership, signify it by saying "aye"; those opposed "no". It is carried. It is so ordered.

DR. HUGHES: I would like to make a motion, that the secretary be authorized to communicate with these gentlemen notifying them of their election to honorary membership.

DR. NEWSOM: I second the motion.

DR. MAYO: All applicants for membership are notified of their election, as well as honorary members.

PRESIDENT MARSHALL: It has been moved and seconded that the secretary be authorized to communicate with the gentlemen named notifying them of their election to honorary membership. Those in favor of the motion signify by saying "aye"; those opposed "no". The "ayes" have it. It is so ordered.

DR. MAYO: It was recommended that the standard set for matriculation by the Bureau of Animal Industry, Circular No. 150 be adopted as the matriculation standard for the A.V.M.A., beginning with the year 1916.

DR. MURPHEY: I move the adoption of the recommendation.

DR. HOSKINS: I second the motion.

PRESIDENT MARSHALL: It has been moved and seconded that Circular No. 150 of the Bureau of Animal Industry setting forth the requirements for matriculation be accepted as the necessary requirement for candidates for membership in the A.V.M.A.

DR. CAMPBELL: I rise to a question of information. I do not get clearly what this is. It was stated in a letter read in this meeting yesterday that new regulations had been put in force. Is this the new standard or the old standard?

DR. MAYO: It is the new one, which I will read:

"1. A matriculation examination shall be adopted by each veterinary college, the minimum requirements of which shall be equivalent to the first grade examination as published in the United States Civil Service Manual of Examinations. Such examination will therefore comprise:

1. Spelling
2. Arithmetic
3. Penmanship
4. Report writing
5. Copying and correcting manuscript
6. Geography and civil government of the United States.

"2. An applicant having a diploma from a recognized college or a normal or high school, or a first-grade teacher's certificate, shall be eligible for admission to a veterinary college without examination.

It is not deemed advisable to make this amendment effective at once, as colleges have already made their arrangements for entrance classes for the coming school year.

By direction of the Commission.

Very respectfully,

J. A. McILHENNY, President."

The adoption of this as our standard for admission into the association is recommended by the executive committee.

DR. STANGE: It looks to me as if this were an amendment to our by-laws. If I understand properly this must go over a year, and it cannot be adopted by the association as an amendment to the by-laws until a year from this meeting. This is simply recommended at this time.

PRESIDENT MARSHALL: In my opinion, that is the way it should be handled, as an amendment to the by-laws, and this is notice given that it will be brought up next year.

DR. HOSKINS: If we adopt it, why won't it appear on the application for membership, to take effect in 1916 as provided for?

DR. MAYO: You understand this means, it will raise our requirements so that those entering veterinary colleges in 1916 must comply with these requirements.

PRESIDENT MARSHALL: Doesn't that mean it is an amendment to the constitution? I don't think Dr. Stange's question has been answered so we understand it thoroughly. Is that an amendment to the constitution? We have a section in the by-laws at present providing for our entrance requirements.

DR. MAYO: It will have to be acted on as an amendment to the constitution to be voted on next year.

DR. HOSKINS: It will appear in next year's announcements that we are going to act on it then.

DR. STANGE: Mr. President, I make a substitute motion that this be brought up at our next annual meeting to be acted on in the usual way as an amendment to the by-laws.

DR. HOSKINS: Is that necessary? If we adopt the recommendation of the executive committee it will come up next year in the same form that the two proposed amendments came up this year and then we make it a part of the by-laws of our association governing the question of eligibility for membership. Isn't that right?

PRESIDENT MARSHALL: I would like to ask how you amend the by-laws in that way?

DR. HOSKINS: It will be presented by the executive committee in the form of an amendment.

(To be continued)

ANNOUNCEMENT FROM THE LOCAL COMMITTEE OF THE A. V. M. A.

The local committee as it now stands is:

S. Brenton.....	Chairman
T. F. Krey.....	Secretary
Finance and Exhibits.....	W. A. Ewalt
Reception.....	G. D. Gibson
Entertainment.....	T. F. Krey
Hotels and Banquets.....	J. J. Joy
Program.....	G. W. Dunphy
Clinic.....	R. H. Wilson
Transportation.....	J. Hawkins
Press.....	J. Black
Registration and Badge.....	J. P. Hutton

While these are the heads of the various divisions, there are thirty-seven sub-committee men.

At a recent meeting of the committee, the Hotel Statler, which is particularly adapted for conventions, was selected as headquarters. It has four capacious halls fully ample to meet all requirements, which we have obtained for the entire week. The hotel has a thousand rooms with baths and is very reasonable in its charges. The committee believes the Hotel Statler will prove to be one of the best hotel quarters ever secured by the association. This hotel is centrally located, within easy walking distance of the principal stores, theatres, and all attractions. There are also a number of good hotels and rooming houses adjacent, which will provide ample room for all visiting members. These hotels are the Griswold, The Tuller, The Cadillac, The St. Clair and The Pontchartrain.

Following mature consideration of the program, the local committee found it essential to extend the convention another day—five days in all. It was thought advisable also, to have the convention convene on Monday morning, August 21st until Friday evening, August 25th, in place of from Tuesday, August 22nd to Saturday, August 26th.

The entire thirteenth floor, which is composed entirely of sample rooms, has been devoted to exhibits. It would be desirable, therefore, for any firms who intend to have exhibits at this convention, to secure space at an early date. Space can be secured either

through the committee or by writing to the Hotel Statler in care of Mr. Madlung, who will be glad to send a diagram of the floor upon request and reserve any space selected.

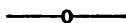
Detroit is a very popular convention city and during the summer months the hotels entertain many transient visitors. It is, therefore, desirable to make reservations as early as possible. The following rates apply to the Hotel Statler:

Single rooms for 1 person, with shower bath.....	\$1.50 per day
Single rooms for 1 person, with shower bath.....	2.00 per day
Rooms for 2 persons, with shower bath.....	3.00 per day
Rooms (outside) for 1 person, bath and shower.....	3.50 per day
Rooms (outside) for 2 persons, bath and shower.....	4.00 per day
Rooms (outside) for 1 person, bath and shower.....	3.00 per day
Rooms (outside) for 2 persons, bath and shower.....	5.00 per day
Rooms (outside) for 1 person, bath and shower.....	3.50 per day
Rooms (outside) for 2 persons, bath and shower.....	5.00 per day
Rooms (front) for 1 person, bath and shower.....	5.00 per day
Rooms (front) for 2 persons, bath and shower.....	7.00 per day

Depending on the size of room and location. All rooms are comfortable—400 of which having shower baths may be had at \$1.50 and \$2.00 per day for one person and \$3.00 per day for two persons.

Rates of the other hotels will be furnished at an early date. The committee will be glad to make reservations for any member.

T. F. KREY, Secretary.



SOCIETY MEETINGS

MONTANA VETERINARY MEDICAL ASSOCIATION

The mid-winter meeting of the Montana Veterinary Medical Association assembled in Bozeman in the Veterinary Building of the State Agricultural College on January 28 and 29. A very interesting meeting with good attendance was held. In addition to the routine business of the association, there was passed a resolution in favor of the Lobeck Bill, H. R. 5792 and the secretary-treasurer was instructed to convey the resolution to each member of Congress from Montana.

The regular program consisting of papers, addresses and discussions was then carried out as follows:

Dr. Howard Welch's address on "Avian Tuberculosis in Montana" and "Coccidiosis in Cattle."

Dr. Welch gave a very interesting account of his investigations of avian tuberculosis in which he enumerated a detailed study of a great many fowls, tracing the infection in certain flocks covering a period of several months, with uniform post-mortem lesions on fowls diagnosed by him as being affected with the disease, and demonstrated by several other autopsies before the association.

Dr. Welch stated that he expected to continue his research studies on avian tuberculosis and hoped at some future time to bring the subject before the profession and the public in a way that will convince them that this disease is far more prevalent among the flocks of poultry in Montana than has been formerly supposed.

Dr. Welch also reported some cases of coccidiosis discovered in the college herd and outlined the treatment which was successful in checking the disease.

Dr. Welch also stated that his investigations of the hairless pig plague had proven that enlarged thyroids invariably accompanied hairless pigs, and that out of a great number of post-mortems on normal pigs, the thyroids were normal and showed a full percentage of normal iodine, whereas, the thyroids of the hairless pigs showed a lack of iodine, or only small traces could be found. He further stated that his research studies along the line of hairless pigs would be continued with the belief that it would finally be proved that a lack of iodine in the food in certain localities would be a probable cause of hairless pigs.

The next address was given by Dr. W. J. Butler, State Veterinarian, on "Sanitary Laws and Regulations." Dr. Butler's address was full of earnest discussion, particularly of the Montana Statutes as they pertain to the live stock sanitation. He explained carefully the methods being adopted and exercised by the State Live Stock Sanitary Board for the regulation of these sanitary laws, and made many other perplexing problems plainer to the veterinarians than they had been before.

Dr. A. D. Knowles discussed the subject of the Veterinary Law of Montana," which was also discussed by the membership in general, there being a better understanding as a result of the discussion of the means used for administering the law.

Dr. F. B. Linfield, Director of the Experiment Station at Bozeman, delivered an address on the "Relation of the Agricultural Extension Work to the Veterinary Profession." Dr. Linfield's address was lengthy and well rendered, but the Doctor digressed

from the subject announced, as he said he wished to cover a still broader field than was comprehended in the subject. His address was full of scientific agricultural history and brought the subject from the beginning of scientific agriculture up to the present time, with many splendid illustrations of the gains made and improved conditions of the clients whom the veterinarians depend upon for their livelihood.

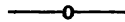
"Veterinary Biologies" was the title of a paper, the author of which was Dr. N. T. Gunn, and was read by Dr. C. H. Stevens. Dr. Gunn's paper showed that he had given the subject a very thorough, scientific and practical study, and while it reviewed fully the scientific side of the subject, his discussion of the choice of the various biological products for use in their various classes of diseases showed an intimate knowledge of their production and uses. The paper was discussed by Dr. Wipf and Dr. Brawner.

A very interesting and instructive address, illustrated by diagrams, was given by Dr. S. M. Smith, of the U. S. Bureau of Animal Industry, with headquarters at Mitchell, South Dakota, on the subject of "Hog Cholera and its Control." Dr. Smith laid special stress upon the methods being taught by him to the farmers throughout the district where he has been working, for controlling hog cholera without the use of serum, particularly instructing the stockmen how to carry out sanitary measures as certain prophylactics for hog cholera, the practice of which regulations, he frankly stated, had already reduced the disease to a minimum, and he gave it as his opinion that it would be the system which would finally eradicate the disease and eliminate the necessity of all forms of vaccination.

The association expressed its appreciation of Dr. Smith's address by adopting a resolution of thanks.

The association voted a minimum assessment of \$1.00 upon each member to be appropriated to the Salmon Memorial Fund.

A. D. KNOWLES, Secretary-Treasurer.



MONTANA VETERINARY MEDICAL ASSOCIATION

The Montana Veterinary Medical Association, at its eighth annual meeting, convened at Helena, September 22-23, 1915, passed a resolution favoring the collection of funds for the relief of members of the veterinary profession in Belgium and Northern France,

who have been thrown into poverty and distress by the present European War.

Dr. M. E. Knowles related his personal observation of the distress of those worthy members of our profession as he saw it during the early part of this year. Veterinarians who, previous to the present conflict, were pleasantly situated in honorable and lucrative practices are now working at any kind of labor they can obtain, trying to sustain the lives of their families.

Dr. Knowles read to the members present at the Helena meeting, copies of the Rules and Regulations of the Anglo-French-Belgian Veterinary Assistance Association which were adopted at Paris, France, May 12, 1915. This association was formed upon the suggestion of Dr. A. Liautard, who is well known to every veterinarian in America, and the committee at the head of the relief association is made up of the most prominent and responsible members of the profession in France: M. Chauveau, M. Lucet and M. Lavakard, who represent in high official capacities the principal veterinary associations in France.

I will quote from one of the above mentioned articles a portion which is particularly applicable to us here now:

"Dear Sir and Brother:—The frightful war which we suffer has brought about in all classes of society miseries of every sort, and like so many others, our profession has its share of mourning and of loss." In the presence of these facts, everywhere sentiments of altruism are awakened and everywhere groups have been formed to extend aid.

It is *this* which concerns us; the Society of Practical Veterinary Medicine began to study, last January, upon the praiseworthy and very generous initiative of our associate, M. Liautard, of the creation of a committee, having for its object to seek out means of coming to the aid, during and above all after the war, of our Belgian and French associates who are affected by the invasion or are victims of the hostilities.

The M. V. M. A. has authorized this office to bring this message to all members of this state, and to the officers of all other veterinary associations in America, urging voluntary contributions to be sent to this office which are to be forwarded to the proper authorities in France. Receipts will be given for contributions and proper recognition will be given to all who donate to this most worthy cause.

A. D. KNOWLES, Secretary-Treasurer.

ARKANSAS VETERINARY ASSOCIATION

The officers of the Arkansas Veterinary Association are Dr. George W. Temple, President, El Dorado, Arkansas and Dr. R. M. Gow, Secretary-Treasurer, Little Rock, Arkansas. The next meeting will be held in January, 1917.

The Arkansas Veterinary Association held its annual meeting in Little Rock, February 14th and 15th. Dr. X. G. May, Fort Smith, presided. This was the best attended meeting the association ever held. Addresses were made as follows:

Dr. C. D. Stubbs, Assistant Veterinarian of the Arkansas Experiment Station, subject: "Hog Cholera." This address was followed by a discussion on the same subject, led by Dr. J. E. Gibson, Field Veterinarian of the U. S. Department of Agriculture, and Dr. John D. Reardon of the Royal Serum Company, Kansas City, Kans. Dr. A. E. Wight, Federal Veterinarian in charge of Tick Eradication Work in Arkansas gave an address on "Tick Eradication." The subject of "Interstate Inspections of Live Stock" was taken up by Dr. R. M. Gow, State Veterinarian, and the discussion was led by Dr. X. G. May and Dr. J. L. Hearn of Texarkana, Arkansas. George Wilkes of the Mulford Company gave an address on "Serum Production."

The association passed a resolution asking for the passage of the Loeb Bill, a copy of said resolution being forwarded to the Arkansas Representatives at Congress. This bill was presented by Dr. J. E. Gibson.

Since the passage of the Arkansas Veterinary Practice Act which was passed by the 1915 Legislature, going into effect June first, 1915, there has been more interest manifested in veterinary practice and the Arkansas farmers and stockmen are bringing in better cattle and hogs and within the next few years, there will be openings in all our farming communities for qualified veterinarians.

R. M. Gow, Secretary.

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY

The regular monthly meeting of the Veterinary Medical Association of New York City was called to order February 2nd, 1916, at 9:20 P. M., by President Goubeaud in the lecture room at the Carnegie Laboratories.

In the absence of the secretary, Doctor Way was appointed secretary pro tem.

Twenty-eight (28) members present.

Minutes of the last meeting were read and approved.

The following gentlemen were proposed for membership and after being favorably acted upon by the Board of Censors, were elected to membership:—

Dr. O. R. Schueler, 1314 Jefferson Avenue, Brooklyn, N. Y.

Dr. David McAuslin, 1632 East 12th Street, Brooklyn, N. Y.

Dr. William Gall, Matawan, N. J.

Dr. J. J. Curran, 111 Powers Street, Brooklyn, N. Y.

A report of the Prosecuting Committee was called for. Dr. Gannett reported progress. Dr. Cochran as secretary of the committee reported that about one hundred letters had been sent out asking for contributions to the prosecuting fund. A total of approximately eight hundred dollars (\$800.00) had been pledged and twenty-one (21) contributions amounting to four hundred and fifty dollars (\$450.00) had been received. It was suggested by the committee to give temporary immunity from prosecution to young men who had recently graduated but had not received returns from their examinations for the State Board. The committee advised that they are endeavoring to raise \$1500.00. The Brooklyn men of the association, it was stated, have responded more promptly than the New York members.

A letter was read from Doctor McLean on this subject. Doctor Ackerman moved that the prosecuting committee proceed with this work and report once a year. Motion seconded and discussion followed. Moved by Dr. Griesman to table Dr. Ackerman's motion. Seconded and carried. Dr. Ackerman advised that he would offer at the next meeting an amendment to the By-laws calling for an annual report of the Prosecuting Committee.

PROGRAM. Dr. R. W. Gannett read a very interesting and instructive paper entitled "Botryomycosis." He took up especially the surgical treatment, illustrated his paper with very interesting specimens and brought out a very good discussion.

Dr. McAuslin reported a case of apparently recurrent botryomycosis after an operation. Dr. Blair spoke regarding the work of foreign investigators on this disease, bringing out the fact that a mixed infection is usually present and the specific organism of the disease causes an inflammatory condition, resulting in thickened connective tissue growths. Dr. Gill, Dr. Griesman and others took part in the discussion.

Dr. W. Reid Blair presented a most interesting paper illustrated with microscopic slides and specimens entitled "Sarcoma of the Heart in a Dog." Dr. Blair's paper brought out many interesting points regarding circulatory and respiratory diseases and he stated that it was his opinion that this infection was much more common than was generally considered by the average practitioner.

Dr. Gill discussed the paper with special reference to certain obscure respiratory cases in canines.

Dr. Roher, Dr. Gannett, Dr. Goubeaud and others took part in the discussion.

NEW BUSINESS. Motion made, seconded and carried that a vote of thanks be extended to Doctors Gannett and Blair for the very interesting papers of the evening.

Dr. Gannett moved the adoption of Dr. Berns' amendment to Article XIV of the By-laws as follows: In the second line strike out the word "three (3)" and substitute the word "five(5)" making the prosecuting committee to consist of five (5) members instead of three (3). Motion seconded and carried.

The president appointed Drs. C. E. Clayton and E. J. Decker as members of the prosecuting committee.

Dr. Ackerman suggested that there had been much valuable time wasted at the meetings in the past by discussing prosecuting committee work and indulging in personalities, etc. He advised that the question be considered of having fewer and better meetings. He suggested a meeting every three or four months to take up one afternoon and evening. Dr. Clayton considered the standard of the meetings rests in the hands of the members. He felt that the meetings might be made more interesting and attractive.

Moved by Dr. Gannett that a program committee of three (3) or more members be appointed to arrange programs in advance and endeavor to bring about more interest in the society. Seconded and carried.

Doctors Ackerman, Way, Clayton, Gill and T. E. Smith were appointed as program committee.

Dr. Way suggested that there was talent enough in New York County and vicinity to provide for the best local veterinary association in the state. He suggested that better and more interesting meetings would undoubtedly bring out a better attendance. A "get-together" dinner was suggested, where the members of the profession might become better acquainted and promote good fellow-

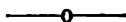
ship. Remarks along this line were made by the president and others.

The resignation of Dr. C. N. Darke was read and accepted with regret.

Dr. T. E. Smith made a few remarks regarding mule footed hogs. Specimens were exhibited and a general discussion was enjoyed.

Adjourned 11:25 P. M.

CASSIUS WAY, Secretary pro tem.



COMMUNICATION

TRANS-ATLANTIC SHIPMENT OF HORSES

Editor of the Journal of the American Veterinary Medical Association, Ithaca, N. Y.:

May I warn, through the columns of the *Journal*, all veterinarians who are planning to accompany shipments of horses to the war zone to carefully investigate the transportation company having the matter in charge! I have recently returned from a trip of this kind and found the company most unreliable.

The salary is partly made up by bonus, though the latter is made practically impossible to gain because of there being included in the shipment a large percentage of horses already sick from influenza and strangles. The head foreman is placed in charge of each shipment and the veterinarian given no power over feeding, watering, etc. The supply of medicines, etc., is entirely inadequate. I believe a certain company was prevented, by the Society for the Prevention of Cruelty to Animals, from taking shipment from Yonkers, N. Y.

Altogether I do not think our brother practitioners should be employed by such companies. If there are others contemplating such a trip and desiring more complete information I can give further details.

Yours very truly,

F. M. PERRY,

Edgell Street, Framingham, Mass.

NECROLOGY

FRANCIS ABELE, JR.

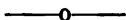
Dr. Francis Abele, Jr., died Sunday, March 26, at the Quincy (Mass.) City Hospital. He had been ill for some time, but an operation performed a few days previously, from which he failed to rally, probably hastened his death.

Dr. Abele was born in Roxbury, Mass., October 25, 1868, and received his early education in the public schools. He graduated from the State Normal School at Bridgewater in 1886. After teaching for a time he entered the veterinary course at McGill University at Montreal Canada. After graduation, he practiced in western Pennsylvania. Later, he returned to Massachusetts, and in 1895 he went to Quincy where he remained up to the time of his death. He was a member of the American Veterinary Medical Association. Since 1899 he had been an inspector of animals. He was a member of the Massachusetts Veterinary Medical Association; a district officer of the Massachusetts State Board of Health; a member of the Rural lodge of Masons of Quincy, and of the Boston City Club.

Besides his father and two brothers, a widow and two sons survive him.

Among the floral offerings was one from the A. V. M. A.

Dr. Winchester writes: "Dr. F. Abele, Jr., was high-minded, dependable, wedded to the profession, and a Man. I considered it an honor to have him as a friend and adviser."



RICHARD B. CORCORAN

Doctor Corcoran, a retired veterinarian of the army, died at the Letterman Hospital March 14, after a long illness. Dr. Corcoran was appointed in 1877 and had served in Indian campaigns and in Cuba. A friend writes that he was also in the Civil War; that he was well read, resourceful, well qualified for his duties and well known among the older veterinarians.

MISCELLANEOUS

Dr. W. Horace Hoskins wishes to express his heartfelt appreciation of the letters, cards and telegrams of congratulation in connection with the great victory for the recognition of our army veterinarians. As it is impossible for him to answer them individually, he wishes to take this method of expressing his thanks for the loyal, steadfast support and aid rendered.

The Massachusetts Board of Registration in Veterinary Medicine will hold its annual June examination of two days on Wednesday and Thursday, June 28 and 29.

Dr. F. C. Hershberger, now at Blagovestscheusk-on-Amur, East Siberia, has arranged with the Chinese government to work another year in Manchuria.

According to the Annual Report of the Maine State Board of Veterinary Examiners for 1915, fifteen men applied for registration. Four were graduates and eleven were non-graduates. As a result of the examination, three of the graduates and two of the non-graduates were registered.

Donnell & Palmer, 17 Battery Place, New York, are agents for the tenth issue of "The Argentine Year Book."

Dr. A. B. Haskins has located at 321 East Third St., Davenport, Iowa.

Dr. W. F. Jones for many years an employee of the Bureau of Animal Industry has resigned. Of late years he has been located at McCook, Nebr., in the Federal Live Stock Inspector's Service. Dr. Jones started as an inspector in the packing houses at Kansas City and was transferred to field service, and has been identified with the Salt Lake City and Denver stations. He has been on the sheep and cattle ranges, assisted in the outbreak of horse plague in Nebraska a few years ago and participated in the latest outbreak of foot and mouth disease. He is a member of the A. V. M. A. and will now practise his profession at McCook, Nebr.

COUNTRY FREE OF FOOT-AND-MOUTH DISEASE. Under date of March 31, the Secretary of Agriculture has issued an order which removes all foot-and-mouth quarantines and restrictions against the shipment and movement of live stock. The last area under suspicion was in Christian County, Ill. Authorities should be alert in case of any sporadic cases that may possibly develop in remote districts.

At the annual banquet of the Alumni Association of the U. S. College of Veterinary Surgeons, Representative Lobeck of Nebraska was announced to speak. Dr. Mansfield officiated as toast-master.

At a hearing before the House committee on rules relative to Representative Linthicum's resolution to authorize a congressional investigation of the dairy business, Doctors Melvin, Mohler, Rawl and Schroeder of the Bureau of Animal Industry, spoke in favor of the resolution. It was pointed out that there is considerable tuberculosis in dairy cattle and that the disease may be transmitted to children.

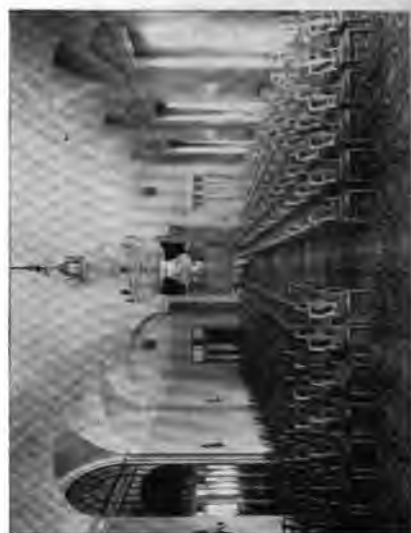
At the graduating exercises of the U. S. College of Veterinary Surgeons, Washington, D. C., D. W. McTyre of Virginia received the Rome Medal for general efficiency.

OX WARBLER IN CATTLE. This trouble has been largely confined to the cattle of the South. Recently the Bureau of Entomology of the U. S. Dept. of Agriculture has discovered that a second species, hitherto not found in this country but known to be even a more serious pest in Europe, has become well established in certain districts in the northern part of the United States. This European species is now generally distributed throughout New York and the New England states and a few specimens have been obtained from western Pennsylvania, western Maryland, southern Michigan, eastern Iowa and Missouri and western Washington. It is also generally distributed throughout southern Canada.

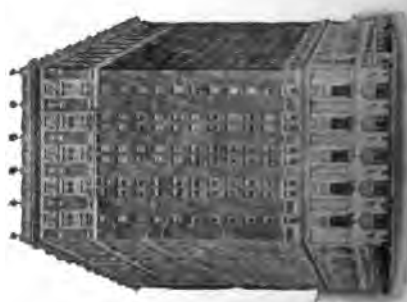
The loss from the warble is not limited to the holes the maggots cut in the hides. Extensive investigations in Germany and Denmark indicate that the losses through reduction in milk supply in dairy cattle, the retardation of growth in young stock, and the loss of flesh in all classes of animals are twofold greater than the damage done to the hides. Extraction of the grubs from the backs of infected cattle resulted in an increase of nearly 25% in the milk production, and a gain of more than 5% in weight over similar animals in which the pests were allowed to develop normally. At present there seems no better way of controlling the pests than through the systematic extraction and *killing* of the grubs. Investigations indicate that eradication may also be accomplished by the use of arsenical dips. In the northern states extraction should be begun in February and the herds gone over again about twice at monthly intervals. Animals transported from one section to another should be examined by the purchasers and all grubs destroyed during the spring and summer. In the winter and spring the grubs will be found beneath the skin on the back. At other times they are elsewhere in the body of the host, and it will be necessary to watch for their appearance during the following season.



CAMPUS



UNIVERSITY HOUSE, A. V. M. A.
BOSTON, MASS.



THE STAPLER HOTEL

JOURNAL

OF THE

American Veterinary Medical Association

Formerly American Veterinary Review

(Original Official Organ U. S. Vet. Med. Ass'n)

PIERRE A. FISH, Editor

ITHACA, N. Y.

Committee on Journal

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The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

VOL. XLIX. N. S. VOL. II.

JUNE, 1916.

No. 3.

Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary C. M. Haring, University of California, Berkeley, California. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

PREPARE FOR THE A. V. M. A. MEETING AT DETROIT

"Coming events cast their shadows before." We are already within the shadow of the next annual meeting of the American Veterinary Medical Association. It has been in the thoughts of the officers for some time and it is desirable that it should now be in the thoughts of the members as well. An instructive and profitable program is in process of arrangement; questions of paramount importance and interest to the profession are to be discussed; reports of value are to be presented and all worthy effort is to be made to make this the largest meeting yet held, both as to attendance and benefits received. All of this necessarily involves much thought and labor upon the officers and committees concerned. The members should now become interested at least to the extent of arranging their plans so that it will be possible for them to be in attendance. The leading motive in attending should be the interests of the profession and the important relationship the association bears in its efforts to advance these interests. A combined and massed effort should be strong enough to effect results.

The selection of Detroit as a meeting place has been a happy one. It is centrally located, when our brother practitioners in

Canada are considered, and is easy of access, by rail or boat. There is much in Detroit to appeal to visitors however diverse their callings. It may be of interest to veterinarians to know that it leads other cities in pharmaceutical manufacturing and is said to have the largest non-proprietary medicine manufactory in the world. It is famous for its park and boulevard systems; its educational system; its automobile production and the many delightful excursion routes on land and water that radiate in all directions with the city as a center. The citizens say that "life is worth living" in Detroit and the many natural and acquired advantages seem to confirm it.



ROAD ON BELLE ISLE

The local committee has worked faithfully and arduously to make this a banner meeting of the association. The governor of the state and the mayor of the city are announced to give addresses of welcome. The atmosphere has been charged with co-operation and generous hospitality is assured. The committee desires that early reservations should be made at the hotels in order that their work may be facilitated. Every effort is being made to make this a memorable occasion and to give the attendants a good time mentally as well as physically. Members should show their apprecia-

tion of this effort by their presence and that of their families. Entertainment will be provided for all.

Secretary Haring, in his efforts to obtain reduced rates for the meeting, sends us the following notice authorized by the Trunk Line Association for the territory which it covers—mostly in the east and middle west: "Two cents per mile in each direction, going and returning via same route only; tickets to be sold and good, going August 19 to 21, and returning to reach original starting point not later than August 29."



THE FORD AUTOMOBILE PLANT

At the present date, the local committee is able to announce the following program:

BUSINESS PROGRAM

MONDAY, AUGUST 21st, 10:30 A. M.—Assemble at Board of Commerce Auditorium.

State address of welcome—Gov. Woodbridge N. Ferris of Michigan.

Detroit address of welcome—Mayor Oscar Marx.

Response—By a prominent member.

Regular business—Evening, 8 P. M. Reception.

TUESDAY, AUGUST 22nd.—Reading and discussion of papers.

WEDNESDAY, AUGUST 23rd.—Sectional meetings—Reading and discussion of papers. 7 P. M. Banquet—Hotel Statler.

THURSDAY, AUGUST 24th, 8:30 A. M. to 6 P. M.—Entire day, the association will be guests of Parke, Davis & Co. Visit Laboratories and sail on Lake and River St. Clair. 7:30 P. M. Election of officers.

FRIDAY, AUGUST 25th.—Clinic, all day. The committee will endeavor to have on hand a number of interesting subjects. Installation of officers and adjournment.

ENTERTAINMENT PROGRAM

MONDAY—Monday afternoon—Visit through the shopping district for the ladies. 8 P. M.—General reception.

TUESDAY, 2:30 P. M.—Automobile ride for the ladies. Seeing Detroit. Tuesday evening—Card party for ladies.

WEDNESDAY.—2 P. M., Matinee Theatre party for ladies. 7:30 P. M.—Banquet. The committee is planning to have a splendid banquet within the means of all members.



STEAMER BRITANNIA

THURSDAY.—All day Thursday the members will be the guests of Parke, Davis & Co. At 9 A. M., the Steamer Britannia will convey the members to the company plant. Following a visit through the laboratories, the members and visitors will embark for a sail on Lake St. Clair through the famous Flats to River St. Clair.

Lunch will be served on board the steamer. The Britannia will return to Woodward Avenue by 6 P. M., allowing ample time for an evening session and election of officers.

THE DETROIT HOTELS

Among the more prominent and easily accessible hotels are the following:

STATLER (official headquarters): \$1.50 and \$2.00 per day for single room with shower bath; for two persons, \$3.00 per day.

\$2.50 to \$6.00 per day for room with tub and shower bath; for two persons, **\$4 to \$8** per day. **\$5 to \$12** per day for two connecting rooms, for two persons; for four persons, **\$8 to \$12** per day. **\$5 to \$12** per day for suites of parlor, bedroom and bath.

TULLER (one block away): **\$1.50** and upwards. Add **\$1.50** to price when two occupy room.

CHARLEVOIX (two blocks away): **\$1.50** and upwards. Add **\$1.00** when two occupy room.

GRISWOLD (two blocks away): **\$1.50, \$2, \$2.50, \$3.** **\$2** and upwards for room with bath. Add **\$1** when two occupy room.

HENRY CLAY (three blocks away): **\$1.00** and up for single rooms. **\$1.25** and up for single rooms with shower bath. **\$1.50** and up for single rooms with tub.

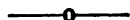
MADISON (three blocks away): **\$1.00** and up for single rooms; **\$1.50** for two persons. **\$1.25** and up for single rooms with bath, **\$2.** for two persons. **\$2.50** and up for two rooms with bath, for two persons.

CADILLAC (four blocks away): **\$1.50 to \$5.** Rooms with bath, **50 cents extra.**

PONTCHARTRAIN (five blocks away): **\$1.50 to \$2.50** for single room; **\$3 to \$4** for double room. **\$2.50 to \$5** for single room with bath; **\$5 to \$8** for double room with bath.

STE. CLAIR (five blocks away): **\$1** and up for single room. **\$1.50** and up for room with bath.

METROPOLE (five blocks away. For men only): **\$1** and up for single room. **\$1.50** and up for room with bath.



HYPODERMAL ANAPHYLAXIS

Dr. S. Hadwen, of the Health of Animals Branch of the Department of Agriculture, Canada, has made an interesting discovery in connection with the research work on warbles he is engaged in at **Agassiz, B. C.**

Following the hint given by **Ries** in the *Receuil de Medicine Veterinaire* Nos. 1 & 2, 1916, regarding the effect of injecting an extract of crushed *Gastrophilus equi* larvae into horses, **Hadwen** has experimented in cattle by injecting *Hypoderma bovis*. The results are most surprising. Within five minutes the animal began to salivate, tears ran from its eyes, gaseous feces and clear mucus

were passed from the anus, there was rapid breathing, labored heart action, the skin turned purple and the animal held its head up. Urine was voided, a constant dribbling occurred and the animal coughed. Very soon the eyelids became swollen and the anus became edematous. The injection was made at 3:15 p. m., at 6 p. m. the animal was still distressed, but at 10 p. m. looked practically normal again. (The accompanying photographs are of this animal.)



No. 1—Anaphylaxis

Subsequent experiments confirmed this result. A steer injected with extract from eight larvae (4 *H. lineatum* and 4 *H. bovis*) at 3:15 p. m. showed symptoms at 3:30. He coughed, slobbered, his eyelids swelled until his eyes were barely visible. The body turned a purple color where the skin was white. Temperature at beginning 101, at 4:30, 99.6. Recovered.

A cow injected with eight *H. lineatum* larvae showed symptoms before the injection was completed. They were the same as previously described but developed more quickly. The body turned a livid purple color. The animal fell and died, all this in less than five minutes. A post-mortem was held but the results must be reserved for a further communication.

Experiment showed that the extract of larvae is non-toxic to small animals. Rabbits and guinea pigs were injected without ill effect.

A sheep was injected with an extract made from four larvae of *Oestrus ovis*. Before completing the injection, symptoms appeared, froth coming from the mouth. The sheep was allowed to rise; it then defecated and stood still with the nostrils wrinkled up and its



No. 2—Anaphylaxis—Note Edema of Anus

head drawn toward its shoulder. Breathing rapid and hard. Skin and mucous membranes a purplish color. The sheep staggered about, fell, got up, fell and died.

Further experiments are being conducted, but what has already been ascertained points to anaphylaxis as the explanation. Cattle harboring warble larvae become sensitized to them and when the system is suddenly flooded with the protein contained in the larvae (and possibly toxins) anaphylactic shock occurs.

F. T.

Dr. W. W. Williams, formerly of Batavia has located at Utica, N. Y.

EUROPEAN CHRONICLES

Bois, Jérôme.

MELANOSIS. Among the many subjects of medicine and surgery, which attract the attention of the practitioner, melanosis is certainly one which ought to be ranked among the first.

Of course, for many it has an interest only from a surgical point of view. Whether a tumor, or an invasion, situated in any part of the body, the important question is whether it can be operated and what are the best chances for recovery. The sequelæ are, many times, not taken into consideration. It may be on an animal of light color, white or grey, perhaps on rare occasions in dark coated individuals. It remains a surgical question.

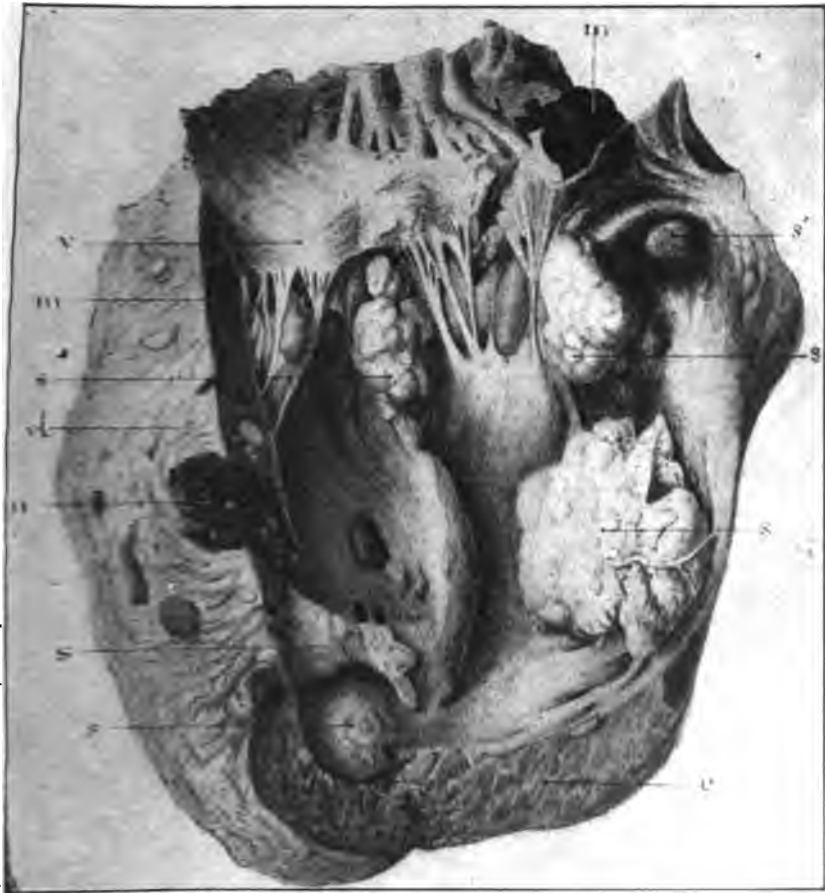
There is, however, another question: that of the presence of melanosis within the body, in the muscles or any other part of the organism. The surgeon gives way to the sanitarian. The presence of melanotic deposits means very often the seizure of a carcass, more commonly in horses, but nevertheless also in cattle where it may also be found.

For these, the practitioner and the sanitarian, the presence of melanotic infection has therefore particular interest. But there is also another point of view, where melanosis deserves attention: the pathological, where in the examination of the various organs, the search is for its presence, the macroscopic lesions that it may give rise to, aid the microscopic changes that it produces. In all of these certain pathologists have not been indifferent and many are the writings that have been published on melanosis.

Prof. G. Petit of Alfort has been one of those who have worked on the subject and he has chosen the *Société Centrale de Paris* as the place where his observations would do the most good and receive the best attention.

These observations were reproduced in several issues of the Bulletins of the Société. They were illustrated and offered to the readers a most valuable stock of knowledge.

MELANOSIS OF BONES. If in post-mortems, the skeleton was the object of serious investigation, it is certain that melanosis of bones, recognized macroscopically, would not be considered any longer as a rarity. The blood transports in the marrow of bones, as everywhere else, not only melanine, but sarcomatous cells where they



No. 1.

MELANOTIC SARCOMA OF THE MYOCARDIUM AND ENDOCARDIUM (COW). Vertical section of the heart passing through the left ventricle.

Note the number and size of the tumors, as well as their various characters. Some are projecting in the cavity of the left ventricle, like enormous grapes of vegetating parietal endocarditis: some of which are pushing against the chordae tendinae: others are deeply inclosed in the cardiac muscle. Some are white, the others look like truffles. There are some which are a mixture of the two varieties.

M-M-M—True melanotic tumors, one in the inter-ventricular septum has some white patches.

S-S-S-S—White tumors of fasciculated sarcoma.

S—White tumor projecting on a melanoma.

C—Unfiltrated myocardium of the point of the heart.

D—Intraventricular septum, with both varieties of tumors.

V—Healthy mitral valve.

(Courtesy of Prof. Petit.)



No. 2.

ENORMOUS INTRA-AURICULAR MELANOMA (Horse.)

Auricles and veins are exceptionally filled with large melanomas, resembling gigantic coagulations and which naturally are united to the muscular structure from which they proceed.

C—Extremity of the right auricle, filled with a voluminous melanotic sarcoma (M. M.) lobulated and vegetating.

V—One of the valves of the tricuspid.

C—Dilated vena cava.

(Courtesy of Prof. Petit.)

proliferate and develop in their ordinary manner, though with a less destructive tendency than with ordinary sarcomatous metastasis.

It is not rare to observe in horses the presence of large melanotic tumors, sub-dorsal or sub-lumbar, which a rectal exploration can detect during life. These tumors spread through the foramina, enter the rachidian canal which they fill more or less, surrounding the nerve roots and pushing more or less against the dura mater. Sometimes it is the spinal cord which is surrounded by the tumor. How the progress takes place is well considered and the microscopic illustrations are very suggestive.

Costal melanosis is also spoken of among the bony lesions. The section of a rib is shown from its internal face, with the pleura covered with desseminated sarcomatous nodules of various size and thickness. Some being of marked black coloration, others grayish. A transverse section of the rib exhibits also the presence of the introduction of the melanosis into the marrow.

MUSCULAR MELANOSIS. The melanotic sarcomas of muscles, of the heart and of the blood vessels come next in the communication of Prof. Petit.

In their development, the muscular sarcomas behave as those of other regions, the intra-muscular generalization taking place by the blood, infrequently in horses. It is only a secondary localization. Indeed intra-muscular sarcomas have importance only from the public hygienic point of view and is under the jurisdiction of the sanitarian in case of the inspection of horse meat for food.

The secondary melanotic sarcomas of the heart is about as rare in animals as it is in man. It was, however, observed in horses first. Special attention is given to the mention of the lesions observed in a bovine, which by their peculiarity offers an interest because it elucidates the pathogeny of the melanotic sarcoma and its evolution and shows that after all, it is but an ordinary sarcoma, having the property of producing pigment, as have others in bones or cartilages. In that lesion, the melanotic infiltration and the development of the cells of the tumor take place in the heart muscular structure as it does in fasciculated muscles.

In relation to the blood vessel melanosis, Petit remarks that it is a very common occurrence in melanotic horses, on the course of the aorta and its divisions, melanotic nodules or infiltrations. A similar condition exists also with large veins such as the vena cava. What is more curious and rare is to find secondary nuclei in the

thickness of the aorta. In those cases, the tumor elements are brought by the vasa vasorum.

MELANOSIS OF CATTLE forms the subject of another communication. Melanosis of the skin is rare in cattle. Petit has seen it and studied its histology, which he illustrates.

PULMONARY MELANOSIS of cattle is sometimes observed as a pigmentation and not as a tumor development of the lungs, and without any other melanotic lesions present. Macroscopic sections through the lungs show sometimes that the infiltration takes place as if being disseminated in the depth of the organ. The histological study demonstrates that it is not a tumor but a progressive infiltration of the melanine through the alveolar septa. The pigment gathers around the bronchioles and arterioles.

The communication of Prof. Petit is continued by the record of a curious case of melanosis of the udder and the histology of palpebral melanosis.

This long series of valuable remarks on melanosis in general is followed by the description of a melanosis of the parotid gland where almost half of the entire organ is involved.

While I cannot here follow the French professor, I present nevertheless two of the figures that illustrate the disease, one from the heart of one of the cattle, the other from a horse. I hope they will prove interesting to the readers of the *Journal*.

HEREDITARY RABIES. In a previous communication made in 1904-1908, Doctor Daniel Konradi has demonstrated that the infectious element of rabies was transmitted from the mother to the embryo. But the demonstrations were not accepted by all and other writers have ignored or denied them by experiments. In another communication Doct. Konradi reviews these objections and confirms by a series of experiments that there can be no longer any doubt of the correctness of the results and conclusions he has made in his previous writings.

The last series of experiments is published in the January number of the *Annales de l'Institut Pasteur*. There are points in the conclusions of this publication which interest all those for which rabies is an important question, from all points of view and with which physicians as well as veterinarians must be familiar.

The first part of the article in the *Annales* refutes the contradictory experiments and conclusions presented against the theo-

of hereditary as demonstrated by Konradi and is followed by the presentation of several series of recent experiments.

Without entering into a complete analysis of each of the series, we can examine the conclusions given, merely referring the reader for more details to the number of the *Annales* where they appeared.

In the first series, the proof is made that in small animals, born 35 days after the inoculation of the mother and almost one year before she died with rabies the presence of the virus can be demonstrated by inoculation from the little ones.

It also shows that the virus taken from a human source, does lose some of its strength, after having been kept six days in carbolized glycerine.

With the second series, it was shown that the virus circulates, for a long time before death, in the blood of the mother and that it passes through the placenta and reaches the fetus. An important question to the practical point of view presents itself: for how long a time can the virus circulate in the blood of an animal affected with rabies before the characteristic symptoms appear and how long can the animal communicate the infection before his death? This question is asked because: "a dog had bitten another fourteen days before his death, and the last dog died with rabies thirty-nine days after he had been bitten."

The third series proved that a male animal infected with rabies and a female in the same condition may produce, 15 to 20 days before death, offspring in which experience has shown the existence of the virus. Hence a new question may be asked: was not the infection conceptional?

In the fourth series was a litter of six little dogs, born of a slut inoculated with the bulb from a rabid dog. They were born 63 days after the inoculation. The father was a healthy dog. These pups were separated immediately, and kept away from the mother, fed artificially and guarded against any possible chances of inoculation. At different dates, varying between 11 and 69 days they died and in all of them after their death with rabies, numerous corpuscles of Negri were found in their brains and the animals inoculated from them, died also with rabies.

After the description of these series, Konradi gives a table showing at a glance the synopsis of the experiments he has made where data of importance is given relating to the number of days for rabies to show itself in guinea pigs and rabbits when inoculated with the virus taken from the fetus.

For instance, it is shown that with guinea pigs the period varies between 11, 20, 22, 23 days and 92, 96, or even 98 days. With rabbits the disease appeared in one after 78 days, in three between 105, 159, 161, in two between 215 and 229 and finally in two between 475 and 725 days.

The article is summarized as follows: 1. The infectious germ of rabies is transmitted from the mother to the offspring, but in this process it becomes weaker and that is why rabies appears later, as the virus is further from its origin.

2. In this transmission, there does not seem to be any difference between the species of animals, as it takes place in dogs, rabbits, guinea pigs and probably also with other animals.

3. For these experiments and to obtain sure results of the inoculation, a rabbit must not be used, but guinea pigs and the injection must be made under the meninges. Guinea pigs being more sensitive to rabies, give more rapid and certain answers to the problem now under discussion. On the contrary, rabbits develop rabies very late and often not at all. This is a factor which has not been taken into account to this day and it is why those who experiment with rabbits only or other animals make erroneous conclusions.

4. It is also very important to continue the observation for a long time if the experiment is made with guinea pigs, because they contract also the disease much later than those that are inoculated with the virus of the mother.

5. The virus already circulates in the blood of the animal infected with rabies, when fever, which is the first symptom of experimental rabies makes its appearance in the beginning of the symptomatic period. With the blood it is transmitted from the mother to the fetus, weeks and even months before death.

6. The bite of a dog is dangerous fourteen days before the appearance of the clinical characteristic symptoms.



PALPEBRO-INTRADERMAL DIAGNOSIS. Although the brilliant application of this method to the diagnosis of tuberculosis and glands is already widespread and has everywhere taken the place of the original classical method and of those that were advocated afterwards, it may not be without interest to refer occasionally to what others may still write of it.

Two of the professors of Toulouse have had the opportunity

to try on a very large scale the palpebro-intradermal tuberculation and have recorded their results in the *Revue Generale* where after giving the technic used, they examined the results and compared the value of the method and presented its advantages under two points of view.

On the professional side, they say: "no obligation of temperature taking; no chance of errors by too early or too late thermic reactions as these variations take place automatically; no necessity to operate at fixed hours; possibility of application in febrile subjects; possibility to make a great number of successive observations and no loss of time."

On the economical side, and for the owners of the animals, "less material disturbance; no immobilization of the farm hands; possibility of application to all the animals without exception in the stable or in pastures at any moment of the day; no, or very little, reduction in milk secretion; no danger of complication of mammitis; no increase of severity of the disease; less cost; possibility of the periodic and repeated tuberculation without excessive expense."

To summarize: 1. Palpebro-intradermal tuberculation has a diagnostic value at least equal to the classical method by subcutaneous injection.

2. It has a simple and quick application and the great advantage of suppressing the enormous labor of thermometrical notes and too frequent errors which occur with them.

3. For the future, it would be best to establish the diagnosis of tuberculosis in general ordinary practice by this method as a substitute for the subcutaneous which should be exclusively reserved for the control of doubtful results and be replaced by the palpebro-intradermal method.

These recommendations and various considerations are already well known to most veterinarians but younger practitioners may not realize the advantages herewith presented as they should, and these, after all, are for the benefit of all concerned.

A. LIAUTARD.

The next meeting of the Georgia State Veterinary Association will be held at Savannah, August 23rd and 24th. The officers are H. G. Cranes, president; J. W. Salter, vice-president; Peter F. Behaus, secretary-treasurer.

STUDIES IN INFECTIOUS ABORTION IN CATTLE*

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PART I.

This laboratory has recognized the importance of research into bovine infectious abortion from the earliest date that this disease began to assume importance as a cattle pest of great economic significance. When Bang and Stribolt published their classic report on the etiology of the disease, C. E. Marshall, then head of this department, reviewed their work in a bulletin from this Experiment Station. Bang's work seems to have attracted little further consideration in this country for a considerable period. Even the unique and ingenious technique of the Danish investigator failed to attract its due attention among bacteriologists. At the Indianapolis meeting of this association in 1912, I had the pleasure of reporting on this subject and at that time reviewed briefly the principal contributions to the literature of the disease.

Our conception of the importance of bovine infectious abortion is shown by a quotation of a paragraph from my annual report to the director of the experiment station for this year, submitted to me by Dr. Hallman. "The problem of controlling contagious abortion is becoming a more and more important one each year. It is estimated by the Bureau of Animal Industry of the U. S. Dept. of Agriculture that this disease causes an annual loss of \$20,000,000 to the cattle industry of the United States. Assuming that the conditions are but average in Michigan, her share of this loss amounts to a little more than \$580,000 annually. We believe that the conditions in Michigan are more than the average. The small farms, small herds, and the policy of a number of farmers in a community to breed to a community bull are all conducive to the spread of the disease."

The successful control of abortion in cattle is not probable without a full scientific understanding of the nature of the causal microbe and the many phenomena of infection and immunity resulting from its interaction with the system of the bovine host. The

*Presented at the meeting of the A. V. M. A. Section on Sanitary Science and Police, Oakland, Cal., September, 1915.

use of chemical drugs has not given promise of success. We, at first, advocated a systematic dosing subcutem and per os with phenol in 2-5 per cent solutions. Others have advocated similar procedure and Taylor has even attempted an experimental explanation of the action of this chemical which had received the stamp of empirical approval many years back in Europe. We have abandoned its use as not hopeful and also not without danger when administered per os as a probable cause of intestinal paralysis. Our casual observations with methylen blue have been less encouraging. Dr. Hallman has undertaken experimental work with a view to determining the action, if any, of this drug.

In the field of biological therapeutics and prophylaxis, we have met with equally discouraging results. My first attempts at immunizing heifers with dead cultures were negative. It was demonstrated, however, that the introduction of such cultures resulted in the production of agglutinins and also exerted a pyrogenic action on the bovine body. I am of the opinion that if there is developed a true immunity to infectious abortion it will be of the nature of a phagocytic immunity and it should be our aim to prepare an antigen, the introduction of which into the body will stimulate the production of opsonins.

Along the line of diagnosis efforts we have given up the idea that, with our present knowledge of the gross and microscopic pathology of the disease, we can make a reliable diagnosis by an ordinary clinical examination of the aborting cow, aborted fetus or placental membranes. Many difficulties stand in the way of direct bacteriological examinations. I have devised an H tube which promises to be of assistance in furnishing a means whereby the peculiar oxygen requirements of the *Bact. abortus* may be satisfied. Medium for the *Bact. abortus* may be placed in one arm of the tube and some oxygen consuming chemical or a medium on which grows an aerobe is placed in the other arm. A communicating tube furnishes full opportunity for diffusion of the gases. The two arms of the tube are plugged with, first cotton, then rubber. We have also called attention to the value of amniotic fluid as a medium, either with or without agar, for *Bact. abortus*. Our results with the *abortin* test have been published. They indicate that this method has some value, but there is need of refinement of the *abortin*. It is well to call attention to the fact that the use of *abortin* and bacterial vaccines will materially interfere with the interpreta-

tion of blood serum reactions, a discussion of which will be found in Dr. Hallman's bulletin. Mr. Cooledge emphasizes the value of milk serum reactions in diagnosis, a field that is very promising.

Finally I wish, again, to call your attention to the hopeful field of lactic acid therapy. We are still of the belief that naturally formed lactic acid by the action of *Bact. bulgaricus* or of ordinary lactic bacteria is the most efficient and at the same time least harmful antiseptic available in the treatment of aborting cattle. It is a question in our mind whether the *Bact. abortus* exerts a specific action in the ovaries or other essential procreative organs of the cow, in such a manner as to seriously interfere, temporarily or permanently, with conception. Certainly there is a great deal of sterility in cattle in herds affected with infectious abortion, and it is equally certain that much of this sterility is attributable to faulty methods of handling the aborting cow, especially the ones with retained afterbirth. The application of lactic acid therapy would obviate much of this trouble. [W. G.]

PART II.

In the spring of 1913 we started a project to compare the complement fixation test with the agglutination test, and to determine if possible, how long after abortion an animal might react to the tests. The herd selected was one in which abortion had existed for the past 7 or 8 years. Our plan was to make periodic tests at intervals of 3 or 4 months throughout a period of several years, recording the results obtained and tabulating the breeding data of each animal tested, not only for the period in which the test was made, but for several years prior to the time the work was undertaken. Unfortunately, we have been unable to carry out all the details of this plan, and the project has been abandoned in this particular case. However, we have a record of a few of the individuals in the herd and are presenting the data we have recorded.

The macroscopic agglutination test with dilutions of 1-100, 1-500 and 1-1000 has been used and .01, .02 and .04 c.c. respectively of the suspect's serum was used in the complement fixation test. A complete agglutination with a dilution of 1-100 was considered a positive reaction to the agglutination test and complete fixation of complement with .04 c.c. of suspect's serum was considered a positive reaction to the complement fixation test.

The following results were obtained: (See table I).

FIRST TEST :

Complement fixation test

26 reacted
14 suspicious
13 negative

—
53 total

Agglutination test

Records lost

SECOND TEST :

Complement fixation test

33 reacted
10 suspicious

—
43 total

Agglutination test

20 reacted
7 suspicious
16 negative

—
43 total

Of the 33 reactions to the C. F. test, 18 reacted to the Aggl. test
5 suspicious to Aggl. test
10 negative to the Aggl. test
—
33

Of the 10 suspicious to the C. F. test, 2 negative to the Aggl. test
2 suspicious to Aggl. test
6 negative to the Aggl. test
—
10

Of the 20 reactions to the Aggl. test, 18 reacted to the C. F. T.
2 suspicious to the C. F. T.
—
20

Of the 7 suspicious to the Aggl. test, 5 reacted to the C. F. T.
2 suspicious to the C. F. T.
—
7

Of the 16 negative to the Aggl. test, 10 reacted to the C. F. T.
6 suspicious to the C. F. T.
—
16

THIRD TEST :

Complement fixation test

20 reacted
7 suspicious
23 negative

—
50 total

Agglutination test

23 reacted
2 suspicious
23 negative

—
48 total

Of the 20 reactions to the C. F. test,	16 reacted to the Aggl. test 4 negative to the Aggl. test
	— 20
Of the 7 suspicious to the C. F. test,	4 reacted to the Aggl. test 3 negative to the Aggl. test
	— 7
Of the 23 negative to the C. F. test,	3 reacted to the Aggl. test 2 suspicious to Aggl. test 16 negative to the Aggl. test 2 not tested
	— 23
Of the 23 reactions to the Aggl. test,	16 reacted to the C. F. T. 4 suspicious to the C. F. T. 3 negative to the C. F. T.
	— 23
Of the 2 suspicious to the Aggl. test,	2 negative to the C. F. T.
Of the 23 negative to the Aggl. test,	4 reacted to the C. F. T. 3 suspicious to the C. F. T. 16 negative to the C. F. T.
	— 23

FOURTH TEST:

Complement fixation test
 26 reacted to the C. F. T.
 9 suspicious to the C. F. T.
 11 negative to the C. F. T.

—
 46 total

Of the 26 reactions to the C. F. test,	6 reacted to the Aggl. test 9 suspicious to Aggl. test 10 negative to the Aggl. test 1 not tested
	— 26
Of the 9 suspicious to the C. F. test,	1 suspicious to Aggl. test 7 negative to the Aggl. test 1 not tested
Of the 11 negative to the C. F. test,	10 negative to the Aggl. test 1 not tested
	— 11
Of the 6 reactions to the Aggl. test,	6 reacted to the C. F. T.
Of the 10 suspicious to the Aggl. test,	9 reacted to the C. F. T. 1 suspicious to the C. F. T.
	— 10
Of the 27 negative to the Aggl. test,	10 reacted to the C. F. T. 7 suspicious to the C. F. T. 10 negative to the C. F. T.
	— 27

Agglutination test
 6 reacted
 10 suspicious
 27 negative

—
 43 total

FIFTH TEST :

Complement fixation test

17 reacted
5 suspicious
24 negative

—
46 total

Of the 17 reactions to the C. F. test,

Of the 5 suspicious to the C. F. test,

Of the 24 negative to the C. F. test,

Of the 13 reactions to the Aggl. test,

Of the 9 suspicious to the Aggl. test,

Of the 24 negative to the Aggl. test,

Agglutination test

13 reacted
9 suspicious
24 negative

—
46 total

10 reacted to the Aggl. test
6 suspicious to Aggl. test
1 negative to the Aggl. test

—
17

1 reacted to the Aggl. test
3 suspicious to Aggl. test
1 negative to the Aggl. test

—
5

2 reacted to the Aggl. test
22 negative to the Aggl. test

—
24

10 reacted to the C. F. T.
1 suspicious to the C. F. T.
2 negative to the C. F. T.

—
13

6 reacted to the C. F. T.
3 suspicious to the C. F. T.

—
9

1 reacted to the C. F. T.
1 suspicious to the C. F. T.
22 negative to the C. F. T.

—
24

An endless amount of discussion and speculation might be based on these results. We only wish to state here that the margin of disagreement between the two tests is not so great as to utterly condemn either or both tests. It is evident that the complement fixation test will pick out more reactors than will the agglutination test but on the other hand, animals may react to the agglutination test and not to the complement fixation test. The opportunities for error in either test are great and we do not assume that our work has been conducted without error, but it may be safely assumed that it has been conducted as carefully as such work will be carried on in the future in routine examinations. In other words, it should give an indication of what may be expected of such work.

Some idea of the significance or lack of significance of the tests may be gained from an account of the history of a few individuals in the herd referred to.

No. 2. Aborted six years ago; has had five living calves since reacted to first 3 Agglutination and C. F. tests. Not tested since.

No. 36. Aborted two years ago; has reacted to every test except 5th Complement Fixation Test; was suspicious to the C. F. T.

Nos. 9, 19 and 26. Aborted two years ago; have reacted to every test except 4th agglutination; each was suspicious to that. No. 9 gave only suspicious reactions to the 5 agglutination test.

No. 16. Aborted two years ago; has reacted only to 2nd complement fixation test; suspicious to 2nd agglutination and 4th complement fixation tests.

No. 25. Aborted two years ago; suspicious reaction to 2nd agglutination and 2nd complement fixation tests.

No. 33. Aborted two years ago; suspicious to 2nd and 4th complement fixation tests.

No. 37. Aborted two years ago; sterile since; suspicious reaction to 2nd complement fixation test; reacted to 4th complement fixation test.

Nos. 7, 28 and 35. Aborted one year ago; have reacted to every test since except that No. 35 was negative to the 2nd agglutination test, and No. 7 suspicious to 3rd complement fixation test.

No. 30. Aborted one year ago; suspicious to 2nd and 4th complement fixation test; reacted to 2nd agglutination test.

No. 39. Aborted 1, 2, 3, 4 and 5 years ago, respectively; reacted to every test except 4th and 5th agglutination tests; suspicious to those.

Nos. 47 and 52. Have never aborted; have reacted to every test except that No. 52 was negative to the 4th agglutination test and suspicious to the 5th agglutination test.

About eighteen months before this project was started, Giltner tested this herd with abortin. There is very little reason to believe that the effects of the abortin injections remained at the time of the serum tests. A remarkable thing about these tests exemplified in Nos. 2, 47 and 52, cows that are apparently able to deliver a healthy calf every year, in spite of a strong reaction to two serum tests, that indicate infection in these cases. It would be interesting to know just what relation the abortus bacte

bears to these cases. With reference to No. 2, is it possible that antibodies resulting from an infection over five years since, could persist all these years, or is she a germ carrier? From the standpoint of sanitary control, should such cows be isolated and quarantined, and should their owners be refused permission to place them on the market for sale?

The use of living cultures of the abortus bacterium on open females and dead cultures on pregnant females, has been applied to a few herds with the object of observing their pyrogenic and immunizing effects.

Not a large enough number of animals have been under observation to make any valuable deductions, nor has any herd been treated with a part of the herd left as controls. It has been difficult to get owners to agree to have a part of their herd untreated, and difficult to get them to record temperatures for several days after the injections.

The method of treatment adopted was to cultivate the organisms on neutral agar until considerable growth had occurred; these were then washed off with sterile salt solution, and diluted so that there were approximately 4 to 5 billion organisms per c.c. Where dead cultures were used the suspension was heated to a temperature of 60°C. for one hour and transfers made to agar to determine their sterility. Where the living cultures were used, they were injected within a few days from the time the dilutions were made.

There is little in our work to encourage one in the use of dead cultures, and there is reason to believe that injury may result in some cases from the use of living cultures. Nothing but an extensive series of carefully conducted experiments will demonstrate the actions of these injections.

In one herd we have recorded the following observations: Of 19 animals receiving living cultures at the 1st injection, 4 gave a marked thermal reaction; 11 gave a slight thermal reaction and 4 gave no thermal reaction. (See Table III.)

Of the 17 animals receiving dead cultures, 7 gave a slight thermal reaction, and 10 gave no thermal reaction. (See Table V.)

Of 15 animals not reacting to the test and receiving injections of living cultures, 9 having calved normally only after experiencing considerable difficulty in getting them with calf; 3 have aborted; 1 has been sold without learning subsequent history and 2 are sterile. Of 2 animals reacting to the test and one suspicious and not tested, all calved normally. (See Table II.)

Of 10 pregnant animals reacting to the test and receiving injections of dead cultures, 4 have aborted (also probably No. 39), 4 have calved normally, and 1 died on the 228th day of gestation with a normally developed calf in utero.

Of 6 animals not reacting to the test, and receiving dead cultures of the abortus bacterium, 3 have calved normally and 3 have aborted. One giving a suspicious reaction to the test, calved normally. (See Table IV.)

At the time the herd was tested we were not in a position to make the complement fixation test and the reactions recorded were the result of agglutination tests made between November 21, 1912 and December 4, 1912. It is significant that Nos. 9, 18 and 20, (Table IV), aborted, although they failed to react to the test several months after breeding.

It will be observed in Table II that considerable difficulty was experienced in breeding a number of the heifers treated with living cultures. When this method is carried out we believe it highly desirable that breeding be deferred for at least 3-4 months after the last injection. In this same herd the same trouble in breeding animals subsequent to calving or aborting, after injections of dead cultures, was experienced. This trouble cannot be attributed to the herd bull as there were two bulls in the herd, both of which had before and since proven their potency. It would be interesting to know what relation there was between these injections and sterility.

In another herd of 21 animals, in which there were 14 abortions out of 20 of breeding age, during the summer, fall, winter and spring respectively of 1912-13 and in which no abortion had ever occurred before, we have recorded the data presented in Table VI.

—[E. T. H.]

TABLE I.

Comparison of the Complement Fixation with the Agglutination Tests for Contagious Abortion in Cattle.

April 22, 1913						July 28, 1913						Nov. 15, 1913						Dec. 31, 1913						April 2, 1914					
C.F.T.		Aggl.		T.		C.F.T.		Aggl.		T.		C.F.T.		Aggl.		T.		C.F.T.		Aggl.		T.		C.F.T.		Aggl.		T.	
.01	.02	.04	1:1000	1:500	1:100	.01	.02	.04	1:1000	1:500	1:100	.01	.02	.04	1:1000	1:500	1:100	.01	.02	.04	1:1000	1:500	1:100	.01	.02	.04	1:1000	1:500	1:100
1	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
2	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
3	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
4	+	+	S															+	+	+	S	S	+	+	+	+	+	+	
5	S	+	+															+	+	+	+	+	+	+	+	+	+	+	
6	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
7	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
8	+	S	+			S	+	+	+	+	+	S	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
9	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
10	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
11	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
12	+	+	+			-	S	S	S	S	+	S	S	+				+	+	+	+	+	+	+	+	+	+	+	
13	+	S	S															+	+	+	+	+	+	+	+	+	+	+	
14	+	S	S														S	S	+	+	+	+	+	+	+	+	+	+	
15						-	S	S										+	+	+	+	+	+	+	+	+	+	+	
16						S	+	+	+			S	+	+			S	+	+	+	+	+	+	+	+	+	+	+	
17		S	S			S	+	+	+			S	+	+			S	+	+	+	+	+	+	+	+	+	+	+	
18	+	+	+			+	+	+				+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	
19	+	+	+						S	+	+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	
20		S	+									S	S	S				+	+	+	+	+	+	+	+	+	+	+	
21																													
22			S																										
23			S																										
24		S	S			S	S	+				S	S	+															
25		S	S			S	S	+	S	S	S	S	S	+															
26	+	+	+			+	+	+	+	+	+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	
27	+	+	+			+	+	+	+	+	+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	
28	+	+	+			+	+	+	+	+	+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	
29						S	S	S										+	+	+	+	+	+	+	+	+	+	+	
30						S	S	S		+	+																		
31						S	+	+	+									S	S	S	S	S	S	S	S	S	S	S	
32	S	S	+									S	S	+				S	S	S	S	S	S	S	S	S	S	S	
33																		S	S	S	S	S	S	S	S	S	S	S	
34						S	+	+	+									S	S	S	S	S	S	S	S	S	S	S	
35	+	+	+			+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
36	+	+	+			+	+	+	+	+	+	+	S	S	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
37																													
38		S	S			S	+	+	+	+	+						S	S	+	+	+	+	+	+	+	+	+	+	
39	+	+	+			+	+	+	+	+	+	+	+	+				+	+	+	+	+	+	+	+	+	+	+	
40						S	S	S	+			+	+	+				S	S	S	S	S	S	S	S	S	S	S	
41			S			S	S	S	+			+	+	+				S	S	S	S	S	S	S	S	S	S	S	
42	+	+	+			+	+	+	+	+	+																		
43	+	+	+			+	+	+	+	+	+																		
44	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
45	S	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
46			S			+	S	S						S			S	+	+	+	+	+	+	+	+	+	+	+	
47	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
48	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
49	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
50						S	S	+	+									S	S	S	S	S	S	S	S	S	S	S	
51	S	S	S			S	S	+	+									S	S	S	S	S	S	S	S	S	S	S	
52	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
53	+	S	+			+	S	+	+	+	+	S	+	+	+	+	+	S	S	S	S	S	S	S	S	S	S	S	
54																													
55			S			S	S	+						S															
56	+	+	+			+	+	+		S	+	S	+	+	+	+	+	S	+	+	+	+	+	+	+	+	+	+	
57	+	+	+			+	+	+										S	+	+	+	+	+	+	+	+	+	+	
58	+	+	+			+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	

TABLE II.
Non-pregnant Animals Receiving Two Injections

No.	Date of Birth	Previous History	Reaction to Test	Date of First Treatment	Amount Injected	Date of Second Treatment	Amount Injected
1	9-4-11	Bred but did not conceive 11-18-13	+	12-14-12	10 c.c.	12-28-12	20 c.c.
3	12-15-10	Calved 9-27-12 Calf died on 4th day with white scours	+	"	"	"	"
5	9-14-05	Last calf 4-2-12	—	"	"	"	"
11	4-10-11	Bred but did not conceive 11-3-12	—	"	"	"	"
13	2-7-12		—	"	"	"	"
14	12-15-10	Calved 7-20-12	—	"	"	"	"
15	2-1-11	Calved 10-9-12	—	"	"	"	"
16	10-23-08	Last calf 10-19-12	—	"	"	"	"
19	8-30-10	Calved 7-20-12	—	"	"	"	"
23	1907	Last calf 9-9-12	S	"	"	"	"
24	1908	Aborted (?)	No Test	"	"	"	"
25	1906	Last calf 11-8-12	—	"	"	"	"
27	7-12-11		—	"	"	"	"
28	5-4-11		—	"	"	"	"
29	5-4-11		—	"	"	"	"
30	5-29-11		—	"	"	"	"
31	7-18-11		—	"	"	"	"
32	7-18-11		—	"	"	"	"
33	7-1-11		—	"	"	"	"

TABLE II (Continued)

of Living Organisms at Intervals of Two Weeks.

Dates of Breeding	Subsequent History
1-22-13 3-18-13 2-8-13 6-19-13 2-27-13	Calved 3-27-14
4-14-13	Calved 1-24-14
1-24-13 9-1-13 4-14-13 10-21-13	Calved 8-3-14
Bred 12-28-12. Came in heat 3-24-13 and was bred	Calved living calf 10-10-13 from Dec. service.
7-22-13 8-13-13	Calved 5-26-14
1-10-13 2-24-13 2-2-13 3-17-13	Calved 12-26-13
1-29-13 4-28-13 2-18-13 3-10-13 6-24-13	Sold
1-2-13 3-20-13 6-14-13 1-28-13 4-10-13 7-8-13 2-18-13 5-12-13 8-28-13	Aborted 4-29-14 on the 281st d. Calf lived until 5-8-14.
12-21-12	Calved 10-22-13
5-4-13 5-28-13	Calved 3-14-14
4-29-13 6-19-13	Calved 3-28-14
4-14-13 5-7-13	In heat again 11-27-13. No evidence of abortion had been observed. Animal sold since.
1-28-13 12-10-13 3-25-13 1-1-14 9-14-13 1-20-14	Calved
2-14-13	Calved 11-20-13
1-7-13 3-5-13 2-3-13	Sold but learned later that animal calved at full time.
1-6-13 3-25-13 1-11-13 5-11-13 1-31-13	Gave birth to a mature calf 11-5-13
3-9-13 7-22-13 6-9-13 8-12-13	Calved 5-20-14
	Aborted 6-7-13
2-24-13	
1-30-13 5-14-13 11-11-13 2-13 7-8-13 12-10-13 2-27-13 9-9-13 1-1-14 1-5-14 2-22-14 4-13-14 7-10-14	

TABLE III.

Temperatures of Non-pregnant Animals Receiving Two Injections of Living Organisms.

1st injection given between 9 a. m. and 2 p. m., 12-14-12										2nd injection given be- tween 2 p. m. and 4 p. m., 12-28-12			
No.	12-14-12	12-15-12				12-16-12		12-17-12	12-18-12	12-28-12	12-29-12		12-30-12
	7 p. m.	9 a. m.	2 p. m.	7 p. m.	9 a. m.	7 p. m.	7 p. m.	6 p. m.		6 p. m.	11 a. m.	6 p. m.	3 p. m.
1.	103.6	103.9	102.	101.6	101.6	104.6	104.	102.2					
3.	102.1	103.6	103.2	101.1	102.1	102.1	103.8	101.					
5.	100.9	105.4	104.6	104.2	101.4	104.8	102.8	101.2					
11.	101.5	103.4	103.4	102.5	103.4	104.4	101.3	102.8	102.1	101.2	102.3	102.	
13.	104.4	102.3	103.4	102.5	103.4	104.4	101.	102.	102.8	101.8	101.		
14.	100.1	104.	103.2	101.8	103.5	104.4	103.9	100.8					
15.	101.6	103.3	103.3	102.1	101.8	104.3	104.2	101.					
16.	101.8	102.	101.4	101.	101.4	101.2							
19.	100.1	104.	104.4	102.9	103.9	102.4	101.6	101.2					
23.	102.8	101.1	101.1	101.6	100.8	102.	102.						
24.	101.8	103.9	103.6	102.5	102.2	102.3	101.8						
25.	101.1	102.	102.4	101.8	101.6	103.4	102.8						
27.	100.7	103.9	104.3	102.1	104.	104.3	101.7	102.7	101.2	100.5	101.5	102.1	
28.	101.2	101.4	101.8	101.3	104.3	104.4	103.	102.3	101.8	101.5	102.2	101.7	
29.	102.4	105.9	105.7	106.5	101.7	103.6	103.2	102.6	101.8	101.8	102.4	101.5	
30.	100.7	102.7	102.6	101.5	104.	101.9	100.	101.6	102.	101.9	101.3	102.1	
31.	102.2	102.8	104.1	103.7	103.7	103.8	104.5	103.	102.7	101.8	102.8	101.8	
32.	100.2	105.5	105.6	106.3	106.6	105.2	104.5	102.1	102.	101.8	101.9	102.	
33.	103.	105.	105.4	106.5	104.8	104.5	104.2	102.8	101.8	101.	101.4	102.2	

TABLE V.

Temperatures of Pregnant Animals Receiving Injections of Dead Organisms.

1st injection given between 1 and 2 P. M., 12-14-12								
No.	12-14-12	12-15-12			12-16-12		12-17-12	12-18-12
	7 p. m.	9 a. m.	2 p. m.	7 p. m.	9 a. m.	7 p. m.	7 p. m.	6 p. m.
2	102.9	102.2	102.1	101.5	101.6	102.8	102.	102.
4	102.1	103.4	102.	101.2	101.	100.8		
6	101.3	101.4	102.	101.5	101.6	100.4		100.2
8	101.2	101.4	101.8	101.2	101.4	101.7		
9	103.8	101.4	101.4	101.5	101.5	102.4	102.4	
17	100.1	101.5	101.5	101.4	100.8	101.3		
18	101.7	101.1	101.4	101.7	101.6	101.		
20	101.2	101.7	101.2	101.6	101.6	101.		
21	100.1	102.1	101.5	101.6	100.7	101.		
26	101.8	102.8	102.8	100.8	101.2	103.	99.8	100.6
38	102.2	101.5	101.4	100.8	101.2	103.		
39	101.3	104.4	104.	101.8	101.3	102.6	103.8	100.6
40	101.4	104.	101.	101.4	101.	102.	101.	100.8
43	101.6	101.9	101.8	101.6	101.4	101.		101.2
45	104.3	102.8	102.	101.4	101.8	102.8	102.2	101.2
47	101.9	101.1	101.6	102.	101.4	101.4		101.8
48	101.3	101.6	101.6	101.6	101.	101.4		101.4

TABLE IV.

Pregnant Animals Receiving Two Injections of Dead Cultures of *Abortus Bacillus* at Intervals of Two Weeks.

No.	Date of Birth	Previous History	In-jection to Test	Date of Breeding	Date of First Treatment	Amount Injected	Date of Second Treatment	Amount Injected	Subsequent History
2	12-15-10	Heifer	+	6-4-12	12-14-12	10 c.c.	12-28-12	20 c.c.	Aborted living calf, 2-20-13 on the 266th day
4	5-20-10	Aborted about 180th day in Dec., 1911	+	7-18-12	12-14-12	10 c.c.	12-28-12	20 c.c.	Calved normally, 4-24-13
6	8-10-07	Calved normally B-15-12	-	10-22-12	12-14-12	10 c.c.	12-28-12	20 c.c.	Calved normally, 7-26-13
8	4-18-11	Heifer	-	10-28-12	"	"	"	"	Calved normally, 8-5-13
9	3-6-11	Heifer	-	6-30-12	"	"	"	"	Aborted Jan. 20-13, on the 200th day
21	1907	Calved normally	+	10-20-12	"	"	"	"	Calved normally, August 2-13
26	3-4-05	Calved normally	+	7-18-12	"	"	"	"	Calved normally, 6-4-13 (?)
17	4-6-06	Calved normally	-	(?)	"	"	"	"	Calved an apparently normal calf, 4-18-13
18	11-5-09		-	7-6-12	"	"	"	"	Aborted, 3-28-13, on the 262nd day
20	1-4-06	Calved normally	-	8-10-12	"	"	"	"	Aborted 2-28-13, on the 198th day
38	9-8-08	Calved normally	+	11-12-12	"	"	"	"	Aborted 6-30-13, on the 228th day
39	1-13-06	Calved normally	+	7-12-12	"	"	"	"	Animal did not conceive. Has been bred several times since without results.
40	12-7-05	Calved normally	+	7-21-12	"	"	"	"	Aborted 3-10-13, on the 229th day
43	6-14-04	Calved normally	+	7-28-12	"	"	"	"	Cow died suddenly, 3-16-13. Normal developed calf in uterus at death
45	(?)	Calved normally	+	8-22-12	"	"	"	"	Aborted, 1-30-13, on the 158th day
47	2-1-11	Heifer	+	5-20-12	"	"	"	"	Calved normally, 3-3-13

TABLE VI.

No.	Age	PREVIOUS HISTORY	Reaction	Date of 1st Treatment	Material Injected	Date of 2nd Treatment
1	3	Aborted 11-4-12	+	2-22-13	Dead Culture 10 e.e	3-14-13
2			+	"	"	"
3		Aborted 12-4-12	+	"	"	"
4		Aborted 12-8-12	+	"	"	"
5		Calved normally 10-22-12	+	"	"	"
6	13	Now in calf (2-22-13)	—	"	"	"
7			+	"	"	"
8			—	"	"	"
9		Heifer not bred yet	+	"	"	"
10	7	Aborted 2-4-13	+	"	"	"
12	6	Aborted 8-25-12	+	"	"	"
13	7	Calved normally 2-6-13	—	"	"	"
14		Calved normally 8-17-12	+	"	"	"
15	6	Aborted 10-3-12	+	"	"	"
16	4	Aborted 2-12-13	+	"	"	"
17	2	Aborted 8-21-12	+	"	"	"
18	4	Aborted 10-2-12	+	"	"	"
19	3	Aborted 11-10-12	+	"	"	"
20	2	Aborted 10-18-12	+	"	"	"
21	2	Aborted 2-11-13	+	"	"	"
22		Aborted 3-1-13	+	"	"	"

TABLE VI—Continued

Material Injected	Date of Breeding		Subsequent History
Dead cultures 20 c.c.	2-16-13	3-9-13	Calved normally 2-12-14
"	5-12-13		Aborted 4-12-13
"	5-14-13		Aborted 12-16-13
"	2-24-13	3-16-13	Bred several times since without results. Sold for beef 8-19-14
"	7-25-13	5-20-13	Delivered a dead calf 1-26-14 on the 269th day of gestation.
"	4-27-13		
Not treated			Calved normally 3-16-13
Dead cultures 20 c.c.			Calved normally 4-11-13
"			Calved normally 10-2-13
Living cultures 10 c.c.	6-8-13		Calved normally 3-12-14
"	5-22-13	7-2-13	Calved normally 4-7-14
Dead cultures 20 c.c.	1-5-13	2-8-13	Aborted 7-8-13
"	6-26-13		Calved normally 4-12-14
"	2-16-13	3-5-13	Came in heat almost regularly and served nearly every time up to 8-17-14
"	7-4-13	5-7-13	
"	2-26-13	3-14-13	Delivered a weak calf on the 288th day of gestation. Calf died at 24 hrs. old
"	4-17-13	5-11-13	
Living cultures 10 c.c.	6-7-13		
"	7-13-13		Calved normally 4-16-14
"	2-22-13	3-14-13	Calved 12-7-13, 33 days earlier. Calf is alive and doing fine 15 months later.
"	4-3-13		Delivered an apparently mature and strong calf 11-12-13. Evidently conception occurred at 1st service.
"	2-17-13	3-11-13	Delivered an apparently mature and strong calf 11-12-13. Evidently conception occurred at 1st service.
"	2-14-13	3-7-13	
"	2-15-13	3-7-13	
"	3-29-13	4-19-13	
"	5-13-13		Aborted 12-1-13
"	6-2-13		Calved normally 3-1-14
"	6-11-13		Calved normally 3-19-14

PART III.

Recent investigations of Schroeder and Cotton show that the organism causing contagious abortion is frequently expelled from the bodies of apparently perfectly healthy cattle with their milk. Bang, Nowak, M'Fadyean and Stockman, McNeal and Kerr, Good, Giltner, Hallman and others have shown that a pure culture of the organism may cause abortion in the following animals: cattle, sheep, swine, goats, mares, guinea pigs and rats. Melvin suggests that this bacterium may prove pathogenic for human beings. It seems quite probable that if this organism is present in cow's milk, which is the only food of many infants, it may bring about disease. There is the possibility that its presence in milk may, in part, account for the high mortality of bottle-fed babies. In view of these possibilities it seems important that a further study of the presence of this organism in milk be made.

In making a study of the presence of *Bact. abortus* in milk there are two methods of procedure available. The cultural method of isolating *Bact. abortus* directly from the milk sediment cannot be depended upon owing to the difficulty of growing the organism on artificial media. This difficulty of growing the organisms by direct inoculations from infected material is due in part to the fact that it acts in a peculiar manner towards oxygen. It will not grow aerobically or anaerobically, but requires an atmosphere partially depleted of oxygen. A number of methods of growing the organisms have been tried by different investigators with but partial success. The most promising cultural method is the growth of the organism in a closed jar with a culture of *B. subtilis*. *B. subtilis* gradually uses up the oxygen and for a period conditions are suitable for the growth of the abortion organisms.

The unusual relation of this organism toward oxygen is shown in agar shakes of a pure culture. The growth then occurs in a sharp zone where the oxygen tension is found to be most suitable. This zone is usually about one-half centimeter below the surface. This organism becomes aerobic after a few generations growth.

The other method of study, the inoculation of guinea pigs with milk, while more reliable, is far from satisfactory, owing to the fact that it requires from 8 to 10 weeks for the lesions to develop and it is probable that the organism must be present in large numbers to cause the disease with the 5 c.c. of milk used for inoculation.

In studying milk from cows affected with contagious abortion

it was thought that possibly the blood serum tests as used in the study of the disease in cattle and horses might be applied, using milk to replace the blood serum. So far, the complement fixation test has given negative results but further work is to be done with it. Work with the opsonic index, while encouraging, has not been carried far. Work with the agglutination test has given encouraging results and it is the object of this paper to tell of experiments upon the application of this test to the milk of cows affected with contagious abortion or in herds where the disease has existed.

The agglutination test used in this work is an application of the serum test used in the study of infectious abortion in cattle. A polyvalent strain of *Bact. abortus* is used for antigen. Fresh milk to be studied is used to replace the blood serum. Dilutions are made as follows 1:50, 1:100, 1:200, 1:500 and 1:1,000. Tests are usually made within 30 minutes of the time the milk is drawn. Cellular counts are made upon all samples. Samples of milk are collected a little before the middle of the milking. It was found that cloudiness caused by using the whole milk did not interfere with the observation of agglutination in the dilutions used.

Milk studied was obtained from a herd having a record of a number of abortions and in which the blood serum of a high percentage of the animals gave positive complement fixation and agglutination tests.

The milk from each quarter of 61 cows has been examined at intervals during the past 10 months. Of these the milk of 18 cows (30%) has given a positive agglutination test in one or more quarters at some time during this period.

Tests have been made upon all milk giving a positive reaction at intervals of 1 to 3 weeks. Milk giving a negative reaction has been examined at intervals of 3 to 6 weeks.

In this way the power of the milk of one quarter to agglutinate the abortion bacterium has been observed to spread to another quarter and finally to all four; it has also been observed to gradually die out. In some cases the milk of all four quarters has retained a strong agglutinating power during the 10 months. In other cases one lone quarter has remained positive during that period.

A comparison of the bacterial count, cell count and original acidity with the agglutination reaction of milk from 7 cows having 12 positive quarters and 16 negative quarters shows a much lower average bacterial count, and cell count, and a slightly lower original

acidity, in the agglutinating quarters. These factors, however, apparently have no significance as a positive milk in one case may have a very high bacterial count and cell count and in another case have very low counts.

One of the first and most important questions that arises in connection with this work is: Is a positive agglutination test due to a local production of agglutinins caused by the presence of *Bact. abortus* in the quarter, or are the agglutinins transmitted to the milk from the blood? In connection with this question an attempt is being made to demonstrate the presence of *Bact. abortus* in samples of milk that agglutinate the abortion bacterium. This work while incomplete has resulted as follows: Out of 18 quarters, the milk of which agglutinates the abortion bacterium, the milk of 14 produce lesions in guinea pigs which are like the typical lesions caused by a pure culture of *Bact. abortus*.

Tests of the power of different portions of an agglutinating milk, to agglutinate the abortion bacterium show that milk drawn about the middle of the milking has the strongest agglutinating reaction. The strippings of a positive milk in nearly every case have a decreased agglutinating power and in many cases are negative.

The fact that in a sample of milk which agglutinates *Bact. abortus*, the first half, or that portion of the milk which stands in the milk cistern, gives a strong reaction, while the last half or that portion which is secreted during the milking process gives a much weaker or even a negative reaction, points to a local production of agglutinins rather than to their coming from the blood stream.

In the 7 cows whose milk has gradually acquired the power of agglutinating the abortion bacterium during this experiment one or both of the rear quarters have been the first to show agglutination. An exception is a case in which a rear quarter and a front quarter showed their first agglutinations at the same time. If we take it for granted that a positive agglutination test points to the presence of *Bact. abortus* in the quarter this would bear out William's theory that the greatest source of infection of the udder is through genital discharges gaining the orifice of the teat by means of running down the sides of the udder or by switching of the tail. According to this theory the rear quarters would be more liable to infection than the front quarters. From the rear quarters then, the infection might easily be transferred to the front quarters by the hands during the milking.

The history of a cow whose milk had never agglutinated *Bact. abortus* is as follows:

Cow Light. This cow has had a record of several abortions and her blood has given positive complement fixation and agglutination tests for contagious abortion. During a period of eight months samples of milk taken from each quarter have repeatedly given negative agglutination tests.

February 25, the right rear quarter was injected with 35 c.c. of a 48 hour broth culture of *Bact. abortus*. The following two days there was partial agglutination by the milk from the injected quarters while the others remained negative. The third day, milk from the right rear quarter gave a strong agglutinating reaction and from the other quarters gave a partial. The fourth day, milk from all four quarters gave a strong reaction. This continued for about a week and then gradually died out until the milk from each quarter was again negative. This seems to show a local production of the agglutinins due to the presence of *Bact. abortus* in the milk.

The history of two cows whose milk agglutinates the abortion bacterium is as follows:

Cow A. A cow that has a record of several abortions, the last, January 1, 1914, has given milk with a strong positive agglutinating reaction in each quarter since April 24, 1914, when the first test was made. *Bact. abortus* was isolated from this milk January 10, 1914. Guinea pigs were inoculated with the milk and became affected with the typical lesions such as are caused by a pure culture of *Bact. abortus*. Recently, a pregnant guinea pig, inoculated with this milk, has aborted.

Cow B. This cow has given milk having a strong agglutinating power for *Bact. abortus* in each quarter since July 20, 1914 when the first test was made. Milk from each quarter, inoculated into guinea pigs August 4, 1914, produced lesions typical of those caused by *Bact. abortus*. The cow aborted a 7 month fetus November 27, 1914.—[L. H. C.]

The officers elected at the last meeting of the South Carolina Association of Veterinarians are: F. P. Caughman, president; Robert O. Feeley, vice-president; B. Kater McInnes, secretary-treasurer.

A PUBLICITY POLICY FOR THE PROFESSION*

F. F. SHEETS, Van Wert, Ohio.

The social and industrial life of America has at no time given gratifying evidence of having gained any very permanent impression of the indispensable share of labor that has been allotted to the veterinarian.

We, who are sometimes inclined to think that we have spent too great a portion of our lives in the insufficiently remunerative work, are repeatedly forced to realize that the public estimation of the men engaged, of the profession as a whole, is not deeply appreciative of the splendid personnel, of the careful educational preparation, or of the arduous labor involved; all of which should afford us a more stable rating among the men of science whose benefits to mankind are readily obvious.

Any means that shall afford the public an opportunity to know more of the activities of a secluded group of men, laboring for the maintenance of health and utility of animals and man, deserves the greatest consideration if it does not violate that dignity which should be conserved in all professional life.

Recognizing the value of precept and experience available through the generous offer of cooperation extended by Dr. Frederick R. Green, secretary of the Council of Health and Public Instruction, a section of the AMERICAN MEDICAL ASSOCIATION activity, it is desired to submit, for more extensive adoption, a policy that has already proven practical in publicity campaign work of a medical character.

As a matter of practice, advertising might be defined as the means by which the conveyor gets in touch with the prospective customer, and while in the strict interpretation of that term, it has long since been decreed that the veterinarian shall not advertise, the time has arrived when we must get in touch with our clients to the extent that only the intimacy of that term implies.

Probably the popular conception of publicity is worthy of our consideration; it appears to be regarded as a refined type of advertising and refers more to a systematized educational campaign on broad lines, in matters not always essentially commercial, while ad-

*Presented at the meeting of the A. V. M. A. Section on Practice, Oakland, Cal., September, 1915.

vertising is the bold, direct appeal calculated to sell definite commodities.

Clever advertising men seem to concur in the opinion that all appeals to that class of men who form possibly, the larger proportion of our clients, must be dominated with a conditional offer of free books, free incubators, free ponies, free corn cures, free jewelry and free advice.

This extension of what, in the perusal of farm journals, we find they hope shall be accepted as some form of Utopian generosity, appears to be the order of the day with men who are, no doubt, specialists in the matter of effectively addressing the public.

Politicians know the efficacy of playing upon this same credulity, but if he cares to succeed, the veterinarian's domain is far too restricted to permit him to forget that the best business interests and instincts of his clientele must be appealed to for a commercial decision of the value of professional attention.

The economy of early treatment and the pecuniary advantages in the application of preventive medicine principles are the superior arguments by which we can appeal to men. Dependence upon chicanery and the temptation to take advantage of the tendency toward superstitious faith in medication, lead to the attainment of a most uncertain standard of professional reputation.

There exist few people in rural communities but know, in their own way, something of the value of the services of the local veterinarian. All too frequently they tell us of live stock disease or injury they would have submitted earlier, had they but known that modern scientific developments stood ready to cope with many heretofore unconquerable conditions.

Little do such stock raisers suspect that our knowledge extends far beyond familiarity with some vague group of remedies said to be beneficial in so called colics, fevers and the healing of wounds; even our neighboring physician is usually surprised to find that we are informed in bacteriology, can make practical suggestions regarding production of sanitary milk, or that some of use have the presumption to offer some really creditable arguments concerning the assimilation, in opposition to the recently assailed inhalation theory of tubercular routes of infection.

The ramifications of the various functions of veterinary activity are so extensive that few of us really appreciate the vastness of our own enterprise. Comparatively few in this busy land of ours

pause to consider the untold interests of humanity, of producer and consumer served by one or more veterinary divisions of this little appreciated branch of the great army of devout men who have enlisted under the red cross emblem of medicine.

Food, industry and health are essential to human happiness. Their consideration in a careless, insincere or dishonest manner is ruinous.

We can best serve the economy of national affairs by continually insisting that the public shall realize that the veterinarian is an important factor in all movements contemplating the conservation of the public health.

Any one who has been engaged in association activity in behalf of the veterinary profession will confirm the statement that in the numerous efforts to better conditions in many of the states and in the army, our petty numerical strength, our political insignificance and the prevailing unfamiliarity with the importance of our varied functions, has formed, in almost every instance, the obstacle we have never yet successfully assailed.

It logically follows then, until we succeed in impressing not only the live stock owner, but all of the public to be benefitted by the measures that are serving to increase our efficiency, we have not made a place for the consideration of our affairs in the legislative bodies of our commonwealths or of the nation; neither have we instilled that idea of increased resourcefulness of modern veterinary advice so important to the successful popularity of the practitioner.

Just to recount some of the things we accomplish: we select suitable types of live stock from the best offered by this and other lands to become the foundation of the industry in this country; we reject the diseased animals offered for import; maintain rational live stock quarantine regulatory measures; prevent disease and treat unavoidable outbreaks, heal the wounds, protect the meat supply, promote the dairy industry, and direct the manufacturing and marketing of its products; we investigate and advise in the presence of poultry disease.

We supervise agricultural education, aid in the development of the science of bacteriology and kindred branches of comparative medicine, and protect the public health from the encroachments of animal diseases that are transmissible to man.

We aid the immigrant in his movements of draft and breeding stock; suggest rational care and shoeing of the draft animals; are

far sighted in our advice concerning breeding and those measures that perpetuate the live stock industry, and cooperate in the work of the humane society.

We are in demand when animals are placed before the people in competitive exhibition; we are the consultants called by the owners of indisposed pets.

We have our place in the study of biology and natural history; must help in the instruction of the agricultural student; serve the army, and aid in the defense of the nation against pestilence.

In the annals of human endeavor do you recall a profession of broader accomplishments, prepared to serve in so many fields of usefulness; a profession recruited from such as can qualify as scientists and be content with the meager remuneration of mechanics; college trained men who must violate natural esthetic tendencies and be content with less compensation than is the share of the artisan?

Education is a slow process but its acquirement among men interested in live stock production, both owners and veterinarians, is rapidly demonstrating the dependence of one upon the other, and this condition is arising from a commercial rather than any sentimental view point.

No business could have withstood the waste and disregard of business principles as has agriculture and live stock production, despite government advice and subsidy, but the old order is slowly changing. Somewhat reluctantly men are comprehending the deeper significance of the industry until there exists scarcely a community but evinces the influence of at least one trained man.

Occasionally, just as in the history of veterinary education, men of few elementary requisites of agricultural proficiency, have directed their efforts in subjects for which they possessed almost no practical attributes, but on the whole the results of progressive agricultural education are inevitable.

Appealing to men who have insisted that education is imperative in the preparation for a medical career to be exerted on animal life, uninformed adventurers into the realms of medical science who depend upon extending the opinion that their ability in live stock doctoring is a miraculous gift, may encounter some difficulty in overcoming the prejudice training affords the farmer, especially if trained veterinarians foster this inclination by proper conduct and a conservation policy for application to all phases of the health and service of the live stock belonging to this class of clients.

In short, as we go from case to case, we fail if we but treat the animals immediately presented for our consideration, and neglect to extend the owners conception of the less apparent complications, such as the depredations of infection, the subtle loss of energy in the presence of communicable diseases of even apparently the lowest virulence.

A suppurating wound, a mild attack of so called distemper, a slight skin infection, any disease or parasitic invasion among meat producing animals or other live stock, no matter how trivial, is a waste, is money dissipated in a way that never can be recovered and the economy of modern methods is rapidly demonstrating that farming can no more ignore economic business axioms than can any other industry that has a responsibility to the commonwealth.

Manufacturers and purveyors are incessantly laboring to supply the market with goods of the best possible quality because experience proves that the character of the demand has had a radically improved tendency occurring within the last few years. Entirely too many of our friends from the farm insist upon flooding the market with three teated cows, unsound draft animals, diseased beef and hog cholera pork, and credit themselves with a really good deal only on such occasions when they have succeeded in reaching a market without acquainting the purchaser with the defective conditions. Every transaction of this kind is destroying confidence and ruining agricultural business reputation and has been permitted to survive for no other reason save the imperative demand for food materials.

Presuming it is no exaggeration to state that a veterinarian can go into almost any stable and point out a minimum average loss in excess of one hundred dollars, preventable if prompt attention could be made the order of the day, reminds us that regardless of our party affiliations, we are being forced to realize that modern business and the trend of the government toward certain socialistic policies, will eventually prompt the commonwealth to further restrain questionable methods and as a result agriculture will be held for a less wasteful accounting of the stewardship.

Individually, in the course of his practice, the veterinarian, in a diplomatic manner, is able to exert a very beneficial influence in correcting conditions that have permitted the live stock owner to remain unadvised in the matter of the commercial significance of prompt adequate attention to pathological conditions which he is inclined to regard as too trivial to demand attention. Even with the

use of discretion in making suggestions the practitioner encounters the danger of being accused of ulterior motives.

Present day advice to farmers through the press and his own periodicals, dominated by the prevalent idea of the fascination of the suggested free service, is a joke to the well informed man but a most serious thing to our profession because it places the popular estimation of the veterinarian on no higher plane than that of the disreputable, discredited veterinary column hack who repeats treatments and advice that was obsolete long before Heck was a pup.

The present practice of the farm press, collecting annually twenty-five cents from Farmer Dupe of Squedunk Corners for the privilege of sending him innumerable pages of high priced advertising matter, paid for on a circulation basis by gigantic business concerns, is apparently inspired with the most philanthropic motives to supply the public with all kinds of commodities free. The paper co-operates by a free veterinary advice column sometimes venturing so far as to indorse the nostrums further guaranteed in the advertising section.

This palpable duplicity that cruelly calculates the revenue to be derived from questionable publicity solely because it has gained that dignity that is presumed to come with public print, we might in no very remote time, be able to supersede with practical advice in matters familiar to the veterinarian, presented by some representative members of the profession who have a commercial regard for the permanent value of integrity.

The lay reader is not to be interested in a technical description of biological detail explanatory of disease propagation. Loss and nothing but loss and its prevention can gain his attention.

In recognition of this fact, knowing the difficulty of maintaining accuracy in popular articles, the physician has found it necessary to select specially trained men, who show proficiency in holding the readers attention by concise statements concerning only such portions of a subject that are so obviously vital to his welfare that no ulterior project can divert his attention.

The devastation of hog cholera, so called Kansas horse disease and the continuous subtle destruction wrought by animal tuberculosis and similar alarming situations, are the active causative agents in the production of periodic hysteria on the part of the editorial and lay writers, who proceed to rejuvenate superstitions, reiterate obsolete theories and advance absurd advice among panic stricken

owners already rendered incapable of using sane judgment in the presence of an apparently inevitable calamity.

Comment upon such grave matters, on the part of uninformed men possibly sincere in a few instances in a desire to render service, but frequently impelled by the opportunity to levy tribute, gain undeserved notice from the chance reader, since such effusions are invariably prefaced with the inference that the situation is unknown in the annals or beyond the control of the veterinary profession.

The resultant injury is two-fold, the owner becomes the prey of the nostrum purveyor and the profession is afforded no ethical opportunity to justify itself until long after such situations have become matters of historical interest.

The basis available for comparison applicable to our affairs from any publicity campaign work comes from a bureau termed the Council of Health and Public Instruction, laboring on behalf of the AMERICAN MEDICAL ASSOCIATION. The data of their four years' experience proves that articles dealing with disease of present day interest, practical suggestions derived from their modes of transmission and precautions for prevention, given the widest possible publication with the cooperation of the best element of the press, becomes a potent incentive prompting the lethargic physician, who has been content to rely upon the medical information of years gone by, to get in touch with modern teachings that of recent years become matters of almost common understanding.

The practicability of such a bureau for our profession would be worth its maintainance in placing fundamental veterinary truths before the public persistently, precluding the possibility of indifferent unprogressive men continuing to delude even part of the people as to what in reality constitutes the worth of modern veterinary services.

A profound science is involved in the consideration of the subjects of veterinary advice, of live stock hygiene. The incomplete and inaccurate articles now appearing are occasioned because editorial attention has not been called to the greater possibilities by representative members of the profession.

For instance, in addition to the inexhaustible fund of information available for publication under veterinary direction, it is a significant fact that whatever beneficial services might on rare occasions be ascribed to the cross roads horse doctor, his limitations, his very existence in Ohio and other states is costing more money in

fatalities and preventable epidemics than the deterioration of any other business could possibly survive.

Would it be an interesting comparison to show that the horse doctor quack is the last survival of his species? Voluble illiterates can still go into many communities and find a few dupes who will engage them to preside over a critical emergency involving hundreds of dollars in live stock, yet this same type of man would not for a moment be considered to possess sufficient mental capacity for the careful work in making a farm ditch.

The proposition submitted is ethical. It has been passed upon by the highest medical court of the land. They have offered the genesis of a work that at no distant date must receive associated activity on the part of our profession, for initiatory procedure anticipating a definite publicity policy.

The selection of a publicity representative should be based upon ability to express that valuable consensus of our professional opinion of the commercial importance of live stock sanitation, hygiene and kindred topics, assembled by some one possessed of a vital interest in the practitioner and who is familiar with our situation as viewed by men, who sooner or later will become interested from the broad basis comprehended by comparative medicine.

Colleges and state live stock commissions have been engaged in extending information through the channels we contemplate using. Obviously their efforts have been pregnant with the indispensability to the farmer, of the specially trained men who overflow these departments.

The men who, after all, are up against the daily problems of live stock disease, are lost sight of in political despotism; else no sincere effort to change live stock production methods would gain recognition without their support being assured.

The efficiency, the purpose of such work as can be done by men acting from state offices, can definitely be measured by their efforts to engage the cooperation of the practicing veterinarian, whose active interest and local concern for the good of the service will broaden as his advice is sought. Laboratory results are rendered worse than impracticable in the absence of advice from a field man, acquainted technically with the subject and acquainted personally with the people of the locality selected for operation.

Do you appreciate the advantage to the farmer, to the live stock interest at large, to the public and to the veterinarian if the

innumerable details of mutual concern could be discussed through the daily and weekly press and various periodical and farm journals; discussed in detail in terse articles presented in a manner that will bring us in an intimate relation with these various groups who shall have a graver appreciation of the veterinarian's vital influence in matters of public welfare?

The possibilities of the presentation of pertinent matter are innumerable. We never had a chance for spontaneous recognition, we know we can not depend upon legislating ourselves into business, we do not expect to intrench ourselves and supply openings for the veterinary graduate through the kindly offices of state or federal influence.

If efficiency is secured every divergent interest, every state department is deeply concerned in its own welfare, and from them we have that lesson of concentration of definite aims to learn. When are we as a representative business organization of our profession, going to begin taking an interest in the commercial aspect of our own enterprise?

We have services to advertise, the practical application of a science to promote, a demand to create; we must cease extolling the other fellow; we must, for a time, desist in the endless pursuit of the intricacies of hog cholera serum production and exhaustive research work; devote our energies outside of the further promotion of technical collegiate activities until we have aroused the business instinct that shall refuse to burden our programs with men at variance with our purpose to promote the business interests of the practitioner, and of the veterinary fraternity at large.

We want just as large a portion of the people as possible to keenly realize a considerable dependence upon our proficiency. We want to get in touch with the animal husbandryman in a business relation that will make us not his occasional adviser, but an incessant confidant because he shall come to realize that indifferent attention to animal health is not consistent with good business.

Could any conceivable opposition long withstand the efforts of earnest veterinarians to justify their position in a systematic manner carefully calculated to inspire the widest interest in articles vital to every live stock owner, if we insist that truth shall be made to prevail and all promotion of foibles, fakes and politics shall be eliminated?

This honesty of purpose is today appealing to publishers enter-

ing all fields. They are denying questionable advertisers, exposing fraudulent concerns and for the reader are demanding a dollar's worth for every dollar expended.

We sometimes become so aroused over the atrocious inaccuracies the press fosters upon the reading public, that we seriously challenge the good faith of news paper and farm paper men who permit their columns to carry a class of agricultural matter that even the uninformed readily recognize as being of the most doubtful value.

Our friend of the press immediately counters with the statement that he is compelled to pay his money for columns or pages of this character, the best his bureaus offer, and if the market affords no better he knows no one more to blame than the silent veterinary profession. An overworked publisher can not constitute himself a censor of such technical matter.

Admitted then, that the profession is awakened to the possibilities, that the press desires an improved source for the live stock and comparative hygienic matter they handle, that the reading public is receptive, the natural query arises as to how we shall go about the work and what it is going to cost.

To be effective it appears that possibly most of the field embraced in the domain of the AMERICAN VETERINARY MEDICAL ASSOCIATION should be investigated in a survey which might be conducted through the state secretaries.

The information derived would serve as a basis for the estimation of the number of available publications, their class, the number and character of readers to be served and the possibilities of extending our activities, together with such further data that would become necessary in the labor of inaugurating what should become a very extensive systematized work, embracing every attractive feature that will help present the numerous unheralded functions by which the several branches of the veterinary profession serve the people.

There can be no doubt that the time is propitious to join forces with such a laudable ambition that seeks to place business on a firm basis, regarding the prime requisite of commercial feasibility, granting every concession consistent with ethics, to the intelligent inquirer seeking detail in subjects involving live stock production and comparative preventive medicine.

The favorable attitude of the AMERICAN MEDICAL ASSOCIATION in their desire to promote public instruction is assured

in advance by the many useful details of experience already furnished through the secretary of the Council of Health and Public Instruction, Dr. Frederick R. Green, of Chicago, who assures us at the same time, that the facilities of his office are at our disposal that we may, if we desire to engage in work of this character, have the benefit of a proven policy in successful operation now almost four years.

Coming as it does from a source high in the council of the representative medical organization of this continent, the kindness of Dr. Green constitutes a rather significant recognition of our profession and deserves the gratitude of the men engaged in the practical application of the principles of comparative medicine as they become available to the veterinarian.

Recognizing that it is possibly the assumption of functions of a committee to be appointed by this body, should the promotion of publicity be received with favor as its practicability surely merits, the privilege is yet asked to make suggestions.

For the purpose of this and numerous other functions best served through formidable organization activity, would it not be promoting efficiency to encourage the numerous local veterinary medical associations of restricted fields of usefulness located in cities and fractional portions of many of the states, to maintain their present identity but to become subsidiary units of their state associations which in turn should be made provincial departments in the various present and future activities of the AMERICAN VETERINARY MEDICAL ASSOCIATION?

This is another idea stolen from an association that has succeeded in doing more for its membership than ever has been accomplished for the veterinarian by any measures that have been instituted in his behalf.

Finally, in arriving at an estimation of the cost of operating a bureau for promoting instruction relative to the affairs of veterinary interest, no approximation is applicable until it could be determined as to the extent and frequency with which it would be necessary to forward members of the press we shall gather upon our mailing list, copies of bulletins containing articles from which they desire to select for publication.

Dr. Green's bulletin is forwarded weekly to 5000 publications, dailies, selected weeklies, farm papers, educational papers and a few labor papers are reached at a cost of eighty-two cents each per year.

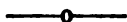
It is probable that the number available for our effective work would be considerably less and the number of mailings should possibly not be over half as many but we could scarcely hope to inaugurate the work at the above significant figure, because the cost of production is minimized through cooperation of other branches of the AMERICAN MEDICAL ASSOCIATION activity.

However, the cost of preparation charged as accurately as possible against the number of articles actually given publication is after all what we should really be interested in and estimating as carefully as can be done by the aid of the press clipping bureau, we find that to our amazement this is done at an expenditure of less than four cents an article.

Further than this comparisons appear to lose their value and only experience could lead to accuracy.

If this project is possessed of merit, and it is; defend it from the jeopardy of him who dares to suggest this announcement comes in advance of its time.

The shores to which we point may not be those of Utopia but they appear prosperous and for our transit thence the bird like craft swiftly cleaving the air is early destined to supplant the lumbering barque that ploughs a troubled sea.



DISCUSSION ON THE INTRAPALPEBRAL TUBERCULIN TEST*

DR. NØRGAARD of Hawaii. I began some seven or eight years ago to try to eradicate tuberculosis from Honolulu and the city and county of Honolulu which includes the Island of Oahu.

In the province of Honolulu proper, there are some two hundred or three hundred cattle but our tests in recent years includes some four thousand or five thousand head of cattle from the Island of Oahu—not dairy kine but cows milked only a part of the time. I began with a subcutaneous test and was sorry to find that we had about thirty per cent tuberculous cattle. We had succeeded in getting the Board of Supervisors of the municipality to pass an ordinance requiring that animals from which milk was being sold must be tuberculin tested. That is as far as it went but I found in the old Statutes of the Territory, a law which made it a misdemeanor to sell, dispose of in any way, etcetera, any animal infected with an infectious or contagious disease, dangerous to human happiness.

*The report to which this discussion relates was published in the October, 1915 number, page 121.

Of course we classify tuberculosis as one of those diseases and the first time I caught a man selling milk from tubercular cattle that had been tested and branded, I had him brought into police court and fined. Since that time the law has held good and condemned tuberculin branded reactors are any longer sold for dairy purposes; the carcass can be sold only when slaughtered and sold for beef.



DEMONSTRATION OF INTRAPALPEBRAL TEST

The following year, that is, after Dr. Ward and Dr. Bal published the article on the intradermal test as first introduced by Mohler and Martin, I took it up immediately and re-tested a number of the subcutaneous reactors and found the results very satisfactory. Since that time and for the past five years, we use the intradermal test exclusively and I have so far to find a reacting animal which, on post-mortem examination, did not show the lesions. Some have been small, others have been large. Of course, during the past three or four years, we have had practically no extensive lesions. We did away with them the first three years.

Two or three years ago we changed from the injection in the subdural fold to the lower eye-lid and we have used that method exclusively since. A second year's test gave about seven per cent, the next, five, and the next, four, and our last test, this spring, brought us down to two per cent, maybe 2.8 per cent, that is for all cattle on the island that are being at all used for milk. At the same time, inquiries from the local board of health, two years ago, as to whether there had been any perceptible decrease in the number of cases of infantile tuberculosis brought the astonishing result, when looked up, that infantile tuberculosis, that is, all cases of tuberculosis in children under five years of age have been reduced in the city and county of Honolulu to less than one-third of what it had been in previous years while similar cases have increased in number in all other islands where no effort has been made to eradicate tuberculosis.

The same results have recently been reached in Leeds and Manchester, where similar conditions existed. Where efforts have been made to eradicate from the commercial milk the tubercular germ, I may further say that every reacting animal has been destroyed and that not a cent of indemnification has been paid. That may seem a pretty hard proposition, but it can be done.

When we started in, the dairy men who cleaned their herds raised the price of milk two cents a quart and I have figured out that the milk consumers of the city and county of Honolulu have paid in that way, at the rate of two hundred dollars per head for every one of the thirteen or fourteen hundred head of reactors that we have destroyed. The cattle probably were not worth to exceed one hundred and twenty dollars nor more than one hundred and fifty dollars per head. The milk consumers have not objected to paying the increased price and, while it is safe to say that all of the money certainly has not come back to the pockets of those who lost the cattle, it has been converted into other channels. I take it, the milk dealers have profited most by it because the milk producer, even today, does not get more than seven or seven and a half cents for his milk, whereas, it sells for twelve cents. I may add that in no single case has it been necessary to go to the courts about any case.

We use the double disc aluminum tag serial number A12909 and we put that in the ears at the time of the injection. When on the third day, we come back to inspect, we have a pair of sharp clamps which are put on the ears of the reactors. If the reactors show we take this clip off by severing it with a pair of forceps and a brand is put on the face.

Everybody there knows now that if they try to sell or otherwise dispose of any of those reacting cows (in the first place nobody wants to buy them) they know what the results will be and it has only been necessary a couple of times to suggest that prosecution would be made and things have been straightened out immediately.

In the city test the two largest losers were the people who could afford it; one of them lost five hundred head, every one of which went to the slaughter house.

At the last meeting of our legislature this spring, a member of the Agricultural College, with which I am connected, introduced a bill for the indemnification of those milk producers who had made an actual effort to clean their herds and protect them against reinfection, where there was no neglect on their part. The bill met with favor and we were promised ten thousand dollars for a starter, when a few of the milk producers took it into their heads that there was not going to be any more tuberculin testing and a few of those people have refused to have their herds tested on various grounds for upwards of a year. They succeeded in killing that bill. We even went to the Board of Health Association and said to them, "What are you going to do about allowing your clients or patients to let their children drink tuberculous milk again? Are you going back to selling tuberculous cows with the corresponding increase of tuberculosis in children or are we going to get rid of the last two or three per cent we have? They thought that we had better get rid of it, so we notified the obstructionists that their milk would no longer be sold or tolerated on the market unless they had their cows tested. They had them tested. Unfortunately, one of these men had twenty-eight reactors out of a hundred and thirty-eight and another had eighteen out of sixty-four and another had eight out of eighteen but those were only the ones that had let more than a year go since they were tested last and who thought that there would be no more tuberculin testing. All of the rest of them, I am glad to say, sixty per cent of the milk producers had herds absolutely free from tubercular animals for two years, some for three years, some for one year and so it came to the point that every one who had a reacting animal was willing to let us make the test every three months until he was clear and until he had the reactors down to three or four per cent.

We tested every three months until it was cleared up, then two times a year until we had every man's herd cleaned up. Now I think we will get rid of the last trace we have and we have taken up the work on other islands where every little cow herd seems to have a considerable amount of tuberculosis. Unfortunately there was considerable opposition to the work but I do believe we shall be able to clean out the disease entirely from the island and without paying any compensation.

I may add a few suggestions: if you gentlemen wish to take it up in your special districts, I believe it can be done everywhere in the world in every country without asking for million dollar appropriation or for hundreds of thousands of dollars, simply by allowing the milk producer to raise the price of his milk and back him up in it. This must be done by an ordinance of the municipality

or medical board of health. You must have the cooperation of the board of health and of the municipality and most of all the medical fraternity. They are the ones who rule. If they agree to help you and to tell their clients and patients and let them know that milk from tuberculous cows is dangerous to the children, that it is well worth while to pay a cent or two more for the milk so that it is clean, I am sure you can succeed.

The first man who came to the Board of Health and demanded a clean bill of health and cleaned out his herd had one hundred clean Jerseys. He raised his price two and a half cents a quart and in the third month after he received his letter, giving him a clean bill of health, the demand for his milk at twelve and a half cents a quart more than doubled in one month, and as I say the price has been maintained ever since.

We have no actual rules or have never enforced any rules to compel a man to take his animal out of his stable. If we had any trouble with a man, our plan was to go and see the people he sold the milk to and have them call him up on the telephone and say, "I understand you had your herd tested the other day." "Yes." "I understand you have a sick cow." "Yes." "Have you still got that cow?" "Yes, I still have it." "Well, you need not send me any more milk." Later another party calls him up and the same thing happens, then another customer and probably after that, he will call me up and say, "For Heaven's sake, Doctor, I will send that cow to the slaughter house." That is the way it is done in every case. That is about all the force we have used. There has been simply moral suasion and it shows you the benefit which can be derived from clean milk from healthy cattle. I wish you gentlemen would get at it because I believe it is up to the veterinarian and the veterinarian alone, if backed up by the local sanitary authorities. He can certainly do it and he must do it. Do not ask for laws and appropriations but get to work. Get the support of your local papers, put a few articles in now and then, stating what tuberculosis is and how dangerous the germs of tuberculosis are to the children through the milk and the rest will be solved.

They will come to get their cattle tested. Tell them to get it out of the consumer by raising the price of milk and that will more than pay for the cost of the cows you have to condemn and remember I started out with thirty per cent.

DR. MCNAIR: I would like to ask Dr. Nørgaard if they have there a certified milk supply and also if pasteurization of milk has been practiced.

DR. NØRGAARD: We have no certified milk but we succeeded in getting one of the best pasteurizing machines installed over there at the plant of the gentleman I mentioned who lost over five hundred head.

I believe when he saw how big a percentage of reactors he had,

he tried to have pasteurization take the place of purification. He sent to New York for one of the Boucher electric milk purifiers which I tested thoroughly and am still testing at intervals. It does the work all right, there are ten to one hundred, or something like that, bacteria per c.c. It absolutely cleans every germ and the milk is not spoiled by the test. I will say that seventy-five per cent of the milk consumed in the city of Honolulu passes through that milk refiner and I believe it is clean.

The Dairyman's Association co-operates in this particular, so that about seventy per cent or seventy-five per cent of all the milk used in Honolulu passes through that machine.

DR. V. A. MOORE: I would like to say a word in regard to the use of tuberculin. I think Dr. Rutherford brought out a very good point in connection with agents. I think that some of us have lived long enough, and have seen and applied annually, various tests a sufficient number of times so that it is perfectly rational for us to consider some of the limitations of methods that in the past have been relied upon practically as absolute.

I think that the papers we have heard this afternoon in connection with the use of tuberculin, and the various methods of applying it, together with the paper which preceded it on the biologics and their effects, cannot but raise the grave question as to why we get these reactions and what their interpretations are. Those of you (and many of you know I have a great deal to do with the testing of cattle especially for interstate trade) who are working along these lines, are interested with me in this question.

Some years ago I pointed out that in the assembling of sound herds, it is important to buy animals from sound herds. That a specific test like tuberculin applied to a particular individual had nothing like the certainty that comes from buying from a sound herd. There are a number of men in the certified milk business who have come to this conclusion.

The analyses of failures in the use of tuberculin as a diagnostic agent have given us quite definite information relative to its limitations in detecting tuberculous-infected cattle. These may be classified into five groups, of which three pertain to the maker and user of the tuberculin and the others to the disease itself. These conditions are as follows, namely:

1. When the tuberculin is made from a strain of tubercle bacteria not suited to that purpose, or, when the tuberculin, by reason of the method used in preparing it, does not contain sufficient tubercle bacteria protein.

2. When in the application of tuberculin sufficient care is not taken to observe its effect upon the individual.

3. When the interpretation of the manifestation of the effect of the tuberculin is not made in accordance with the laws governing the reaction between tuberculin and tuberculous lesions in a living animal.

4. When tuberculin is applied during the period of incubation.
5. When tuberculin is administered to animals in which the tuberculous lesions are arrested, healed, encapsulated, very extensive or, in any other stage where a reaction may not be possible, the tuberculin fails to give indication of the presence of the disease.

The first three of these reasons are so obviously self-explanatory that I need not dwell upon them. The failures resulting from these causes should not be attributed to any limitation of properly prepared tuberculin, although in the past many unhappy experiences have been traced to the tuberculin used. The fact that tuberculin is not properly made should not be considered as an argument against it. Likewise, the failure to detect the reaction through incomplete observation or knowledge of the subject, or the failure of an animal to react while in the period of incubation, is not the fault of the tuberculin. However, many recently infected animals that are still well within this period have passed the test and subsequently been found to be diseased. Usually the tendency of the purchaser of animals tested at this stage of the disease is to condemn the tuberculin or speak with uncomplimentary epithets of the person who applied it.

The early report of the use of tuberculin in this country, together with the pathology of bovine tuberculosis, as published in Bulletin No. 7 of the Bureau of Animal Industry, pointed out the necessity of careful observation of the temperature of the animal to be tested both before and after the injection of tuberculin. Twenty-four hours were considered necessary for pre-injection temperatures and perhaps longer than that after the injection. This procedure, however, did not meet with the approval of the practitioner or cattle owners, because of the time required. Consequently, the method was very soon modified to taking but one or two preliminary temperatures and few post-injection ones. The corollary to this was that many cases that would react late were missed. This has given rise recently to important articles calling attention to late reactions. A result of this abridged method is found in many herds that have been tested, the reactors removed and subsequently they were found to be infected from the undetected case or cases that escaped the initial test. While a large majority of reactions will be detected in from twelve to eighteen hours after injecting tuberculin, a few cases will not give a reaction until from eighteen to thirty-six hours after. It is not unlikely that occasionally a reaction will take place still later.

Again, the rise of temperature necessary to indicate a reaction was thought to be at least 2° F. above the maximum pre-injection temperature. Then a rise of 1.5° F. was accepted as sufficient evidence of infection. The true reaction—namely, a gradual rise, a festidum and a gradual decline—was not seriously considered as the essential indication of a temperature reaction. However, the one-

time standards for determining a reaction are no longer rigidly adhered to. The interpretation of the response of the animal body to tuberculin, be it thermal or organic, is carefully studied and the decision as to whether or not there is a reaction is made as a result of the study of the case in its entirety. One of the difficulties in this work is to decide upon the doubtful reactions. This cannot be accurately done, except to consider all such cases as questionable and retain them for further study and subsequent testing. There are questions that no man can answer accurately yes or no.

The most commonly encountered failure is where the lesions are in such a stage of healing or encapsulation that a reaction does not follow the injection of tuberculin. It often happens that a subsequent test will be positive, and that again followed by negative results. These have been very confusing, and in actual dealings they have given occasion to unfounded hypotheses regarding the integrity of one or more of the parties concerned. These failures occur more frequently in herds of long-standing infection or in those assembled by purchasing non-reacting individuals from such herds. The International Commission of the American Veterinary Medical Association for the Study of Bovine Tuberculosis reported that when 50 per cent. or more of the animals in a herd reacted the entire herd should be considered and treated as tuberculous.

The limitations of properly prepared tuberculin in detecting tuberculous animals are restricted: (1) to errors in applying it; (2) in failing to ascertain all that it may reveal by way of thermal and organic reaction; and (3) to the failures in securing a reaction when the stage of the disease is such that a reaction does not occur. I believe we could say when the conditions are such that a reaction cannot take place. Concerning these failures we are sure only of the fact that now and then they occur. A true explanation for the non-reaction of tuberculous cattle to tuberculin must wait for the recording of further experimentation and study.

The limitations of tuberculin do not detract from its use, but add to the importance of a thorough understanding of it. Tuberculin is conspicuous among diagnostic agents for the great assistance it gives in detecting tuberculous cattle, but it should be recognized as an aid and not as an infallible test. There are two practical lessons to be taught from the results of experience with and extensive studies of tuberculin, namely:

(1) the danger of buying non-reacting individuals from infected herds—that is, cattle that have been exposed to infection and

(2) the necessity of dairymen, wishing to maintain clean herds, raising their own animals or purchasing them from healthy herds. The unit to deal with in buying cattle is the *sound herd* rather than the non-reacting individual animals.

In the dairy to which Dr. Roadhouse referred the loss was very heavy. Tuberculin does not tell us about the lesions, and it is get-

ting to a point where veterinarians are being criticised. I have actually heard them accused of wrongdoing because a man had bought an animal that had been tested by a veterinarian, had failed to react, and in six months or a year, perhaps longer, he has retested that animal and it has reacted. He puts the blame upon the man who made the first test, or the man who sold the animal. He is looking for some fraud, some unlawful act, but it may not be that. In a great many of these cases I believe the men were absolutely innocent. The supposed error can be explained in many of these cases by their not taking into account the fundamental fact that in certain instances tuberculin cannot give a reaction.

DR. J. TRAUM: We have discussed the sub-cutaneous and intradermal tuberculin testing of cattle, and the intradermal testing of hogs. In California we are very partial to the intradermal test and do not limit ourselves to either cattle or hogs, but also give guinea pigs the intradermal test. A good many of the laboratory workers are interested in determining as soon as possible by guinea pig inoculation, whether or not the material injected contained tubercle bacilli. One of the methods of saving time is to inject the animal either subcutaneously or intraperitoneally with about 2 c.c. of ordinary tuberculin and if the animal dies, or is made severely ill within 24 hours, it is considered good evidence that the animal is tuberculous. Those reactions, however, can only be obtained in guinea pigs having rather well developed cases of tuberculosis. The animal would have to remain alive for about six weeks. But with this intradermal test you can cut down the time considerably. In our experience 16 to 20 days after inoculation reliable results can be obtained. Römer, Esch and Schnurer claim that determination can be made at the end of ten days. Even with no evidence of lymph gland involvement, they were able to get distinct intradermal reaction. I have thus far tested about three hundred guinea pigs that were inoculated with suspected tuberculous material and only one failure is all I have had in this number of cases. The point of inoculation may be any part of the thorax or abdomen; we prefer a light area, buff or white. The dark area is less desirable because there is a color reaction attached to this test, and while it can be recognized and interpreted very readily in dark areas, the light area is to be preferred. The area, about two inches square, is shaven, or better still, a depilatory is applied. Shaving sometimes produces breaks in the skin, making proper interpretations at times difficult. The center of the area is injected with one tenth of a c.c. of twenty per cent. tuberculin O.T. We have used 20 per cent. tuberculin O.T. because it was recommended by the workers mentioned and have found no reason to make a change, although we believe that the purified and other tuberculins will give very satisfactory results. Reactions will appear in 24 to 48 hours, but in doing intradermal testing we do not like to interpret results at the end of 24 hours, so

we make it a point to make observations at 48 and 72 hours. Non-tubercular guinea pigs as a rule will show no swelling at the end of 24 hours, but sometimes a thickening will be present in such animals which will, however, disappear within the following 24 hours. In tuberculous guinea pigs we find three grades of reactors. The XXX reaction, the severest form, consists of a circumscribed edematous swelling (Quaddelbildung) varying in size from a quarter to a half a dollar or even larger. The central portion of this swelling shows a hemorrhagic area surrounded by a porcelain like zone and this in turn is surrounded by another hemorrhagic area. This reaction is very striking, the color changing, becoming purple and green. Such reactions last for several days. I have known the reaction to persist for eight days. The second grade, which is described as XX reaction, consists of the same picture, but without the central discoloration. The third and mildest form, the X, consists of a large swelling usually about the size of a quarter, but may be a little smaller, which persists for at least forty-eight hours. I have found this test of great help in experimental work. Frequently, tests were made when there were no physical indications of tuberculosis in the guinea pigs, and I have been able by the reactions of this test to tell whether or not the material inoculated into these animals contained tubercle bacilli.

DR. MCNAIRS: Dr. Traum neglected to state one point of interest. With what materials did he produce the disease in these pigs? I happen to know, but I thought that the rest of you might be interested to know.

DR. TRAUM: These pigs are ordinary guinea pigs used in routine work examining feces, sputum, milk and other secretions from cows. Out of three hundred guinea pigs which have already been tested, practically all have been autopsied. Tuberculin is injected by taking hold of the central portion of the shaven area with the thumb and index finger of the left hand and the use of a twenty-five or twenty-six gauge needle of about a quarter of an inch in length. The needle is slipped into the skin and the tuberculin injected intradermally. A bleb about the size of a pea should result from this injection. This is then carefully massaged or stroked.

DR. MOHLER: We have also applied the intradermal test inoculating tuberculin in guinea pigs with very satisfactory results. Of course this method has been applied before in tuberculin injection, especially by a man we have in North Dakota. He has even found the reaction in a bird, like the golden pheasant.

Dr. Alfred Savage, formerly of Macdonald College, Quebec, has been appointed Lieutenant and "V.O." to the 11th Field Howitzer Brigade, 3d Divisional Artillery in England.

SOME EXPERIMENTS WITH BACTERIAL VACCINES FOR THE CURE OF SPLENETIC TICK FEVER IN CATTLE

R. L. RHEA, D.V.S., San Antonio, Texas.
G. W. MACKIE, V.S., Detroit, Mich.

SYMPTOMS: Texas Fever, Tick Fever, Bovine Malaria, Spanish Fever, Bloody Murrain, Southern Fever. Texas fever is an infectious fever of cattle, characterized by high temperature, hemoglobinuria, destruction of the red blood cells, and presence in the blood of a protozoon, known as *Piroplasma bigeminum*, so called by Theobald Smith, the discoverer, which is transmitted from animal to animal by the cattle tick, *Boophilus annulatus*.

An interesting fact of this disease is that cattle raised in infected districts, become immune early in life, and carry infection in the blood after immunity has been established, which infection may be transmitted to non-immune animals by artificial inoculation, while they, themselves, remain practically well and healthy.

ETIOLOGY: The cause of the disease is an invasion of the blood cells by the *Piroplasma bigeminum*, which is transmitted to the susceptible host by the cattle tick, *Boophilus annulatus*. These organisms pass through the following stages, producing the disturbances enumerated herein, as recorded by Lignieres as follows:

1st: The pear-shaped bodies which are found in the red blood cells are usually connected.

2nd: The round cells with the dividing nucleus.

3rd: Larger infectious organisms accompanied by smaller organisms, which Lignieres calls "Germs".

Just what part these so called germs play in Texas fever, we do not know, but we do know the blood from cattle, which have been exposed to the invasion, will, when injected into healthy non-immune cattle, produce Texas fever, and that immunity can be established by the blood inoculation of young cattle.

SYMPTOMS: In the acute type of the disease, which usually occurs during the hot summer months, the onset of the disease is sudden; the first indication of the disease is a rise of temperature, generally higher in the afternoon, but this variation is minimized later in the progress of the disease, when the temperature remains high—which is usually 105 to 107 degrees Fahrenheit. By use of

the thermometer the elevation of the temperature can ordinarily be detected two or three days before other symptoms appear. During the progress of the disease the respiration is quickened and the pulse 80 to 110. Presence of hemoglobin in the urine depends largely on the rapidity of the progress and severity of the attack. In mild attacks the hemoglobin may be taken up and destroyed by the other organs and no discoloration be detected in the urine. There is a loss of appetite, cessation of rumination, paleness of membranes—the course of the disease may vary but the continuous high temperature usually lasts about ten days—however, death usually comes in from five to eight days.

POST-MORTEM LESIONS: Post-mortem changes take place rapidly in cattle dying from tick fever, so all post-mortem examinations must be made soon after death, or else the lesions found may be misleading. There are no external lesions of the disease—however, occasionally an edema of the subcutis on the ventral portion of the body has been noted. The muscles are pale; otherwise normal in appearance.

Internally, the most conspicuous changes are in the spleen; this organ is much enlarged and increased in weight from two to four times; the pulp may be firm, but usually is semi-fluid so that it oozes out when the surface is cut. The liver is extensively affected; it is enlarged and congested; the bile ducts are more or less distended; the color is paler than normal. The surface is usually somewhat mottled; the gall bladder contains usually, an abnormal quantity of thick bile. The bladder may be ecchymotic. There are no constant symptoms in the digestive tract, only extreme dryness of the fecal matter may be noted from the extreme high temperature the patient suffers.

Texas fever is strictly a blood disease, so it is there the principal and most constant changes occur; the blood becomes thin and watery by destruction of the red blood cells.

DIFFERENTIAL DIAGNOSIS: Tick fever is usually differentiated from other troubles of infections noted by the presence of the specific parasite on the animal and in most cases by the history of the case. The enlargement of the spleen may be somewhat confounded with anthrax; however, the other symptoms of tick fever counterbalance any similarity.

The tests referred to in this report have been conducted during winter months (Note this has been an unusually hot winter), dur

ing which time, the violence of attack of tick fever is attenuated by the lack of the high climatic temperature. We do not, however, think the affected animal lives because of the cold weather but the violence of the attack may be increased by the extremely high climatic temperature, while an animal may possibly recover from an equally violent attack on account of the degree of depression we find during cool weather.

The cases treated with the Streptococcus and Staphylococcus Vaccine Combined (Bio. 828, Parke, Davis & Co.) were cattle varying in age from eight months to aged animals, the temperature varying from 104 to 107½, and in many cases extreme symptoms of the disease were accompanied by emaciation.

In many cases hemoglobinuria was present; in some, there was uncertain gait accompanied by extreme weakness, short, quick breathing, high pulse, etc.

CONCLUSIONS: The body of all animals is at all times the host of microorganisms which are incapable of setting up disturbances when the body has a high resistance, but if for any reason should the body resistance drop below normal in vitality, these same latent organisms may become pathogenic.

The infection producing tick fever primarily is *Piroplasma bigeminum*; however, when by its action the resistance of the body is reduced below normal, these organisms may cause a secondary infection and with their toxins may assist in producing symptoms which accompany tick fever. The fact that the use of bacterial vaccine gives results in Texas fever, we may conclude the germs spoken of by Lignieres may be some unnamed specie of streptococcus or staphylococcus. The fact that immunity can be established by blood inoculations warrants us in saying that antibodies may be produced in the blood by proper stimulus, and as the agent used in this test work is a streptococcus and staphylococcus vaccine, so antibodies produced by this type of vaccine combat only that type of invasion, so we may conclude they play an important role in this disease.

This experimental work covered a period of six months. The number of cases treated were one hundred and forty, of which one hundred and eighteen made good recovery; these cases varied from mild cases to the most severe, we had many cases that would have undoubtedly terminated fatally, in fact the large majority, only a few would have recovered with the old line treatment.

We will classify these cases into three:—A. Class being cases treated with one dose of 1 c.c. of vaccine. B. Class those cases treated with two doses, viz; 1 dose of 1 c.c. and the second dose of 1½ c.c. of vaccine—and C. Class, which was treated with three doses, viz; first dose of 1 c.c., second dose 1–1½ c.c., and the third dose of 2 c.c. of vaccine.

The cases treated with more than one dose received the second or third doses three days apart. In a few instances, we gave a dose of one-quarter grain of strychnine, and in three cases we gave one pound of mag. sulph. No other treatment being given other than the vaccine.

Class A. was given but one dose of vaccine, being 1 c.c. consisting of eight billion dead bacteria.

We treated twelve cases in this class; six recoveries and six deaths. This is accounted for from the fact that the majority of the patients were very far gone before treatment was given; for instance, in case No. 10 the temperature was subnormal when we saw the case, being 96°. This patient died the following day. Case No. 11 was very severe, the patient having been ill for some time and the temperature being 108°; this animal died at 4:30 the following morning. In none of the six deaths did the patient live more than two days. These might be classed as hopeless cases.

The recoveries in this class were six. Case No. 12 was a very severe one; the animal being unable to walk and in very poor condition. We did not see the cow again on account of the distance from San Antonio. The owner telephoned on December 2nd that the patient was in good condition and as well as ever. Case No. 24 was given one c.c. of vaccine on March 23rd and the owner telephoned on the 29th that the animal had made a complete recovery.

In Class B, all of which were given two doses of vaccine, we had twenty-six cases with four fatalities; of these we had five of the most severe type, all making good recoveries.

In Class C, we treated one hundred and two cases, with only twelve deaths; these all received three doses with the exception of six, which received four doses, the most we gave any case.

We find the best results are obtained from an initial 1 c.c. dose of eight billion, next followed in three days, consisting of twelve billion, and the third dose of sixteen billion killed bacteria.

Independent of these reports a herd of non-immune heifers were shipped to the city of San Antonio. These animals (88 in

number) received 1 c.c. of vaccine each an initial dose, $1\frac{1}{2}$ c.c. five days later, and the third dose of 2 c.c. of vaccine after a period of five days.

These calves, varying in age from six months to two years, have now been in tick infested pastures about 15 days but none have shown any effects from infection from ticks. It was also noticeable, the rapid improvement in general condition these calves made, even on very poor feed.

We beg to say that we have no doubt whatever as to the merit and curative value of Bio. 828 in treatment of Texas fever. There were 140 cases treated with 85 $\frac{5}{7}$ % of recoveries.

THE PASTEURIZATION OF SKIM MILK AND WHEY AS FOOD FOR CALVES*

VERANUS A. MOORE, Ithaca, N. Y.

I accepted the invitation of your President to present a paper on "pasteurized skim milk and whey as food for calves" with considerable hesitancy. The subject comprises questions which are complicated and difficult to explain. They combine principles of sanitation and problems in dietetics. Its execution demands the observance of great care, and patience must be exercised during the development of the best methods for its application. Notwithstanding, the pasteurization of creamery and factory by-products is a practical question squarely before us at this time.

The nature of this subject is not unlike many others in sanitary and medical sciences which have presented themselves for adoption before their merits were fully understood, but which have finally become firmly incorporated in our methods of procedure.

The application of antiseptics, the preventive treatment for rabies, and the use of antitoxins, each a daily life-saving procedure, involve principles that were difficult to comprehend and still more trying to apply. In whatever field of human activity real progress is made, the controlling principle has first to be recognized in the hitherto unperceived elements of knowledge and orderly truth crystallized out of what has appeared to be a jumble of facts.

* Address given at the Meeting of the New York State Agricultural Society, January 18 and 19, 1916.

The pasteurization of skim milk and whey as food for calves includes two important factors; namely, the prevention of the spread of the germs of infectious diseases through the milk and whey, and the dietetics of heated milk. From the practical point of view the two must be considered as one problem, but for an understanding of the subject they should be separated and analyzed independently.

The principle of pasteurization, and the name itself, comes from the work of Louis Pasteur. From time immemorial the souring of beer and wine baffled all attempts at cure. From 1860 to 1865 they threatened the destruction of these industries in France. Pasteur found that there were two microorganisms involved, one bringing about the satisfactory ripening of the wine, and the other, the cause of the acid, producing sharp or sour wine.* By the experimental method which he introduced, Pasteur found that by heating the wine to 60 degrees C. (140 degrees F.) it did not sour, but ripened properly. In other words, the wine could be heated sufficiently to destroy the *Mycroderma aceti* which caused the souring and not injure the *Mycroderma vini* that later developed the proper color and flavor. The heating of wine was not a new process, but the finding of the particular temperature to which it could be brought without injury had not been considered until the definite purpose of the heat was determined, and the cause of the souring and of the proper ripening ascertained.*

Later, when disease-producing bacteria were found in market milk, Soxhlet (1886) recommended the pasteurization† of milk for infant feeding. The process here, as with the wine, consisted in heating the milk to a temperature high enough to destroy the

*Simple as this process seems there was much opposition to the method proposed because it was thought to affect the flavor of the wine. This opposition became pronounced. To justify his procedure, Pasteur organized a "tasting" experiment at the *Ecole Normale*, where the critics and connoisseurs were invited. They tasted and tasted of the pasteurized wine and of that which had ripened properly without heat. Some of them pronounced the pasteurized and others the unheated wine to be preferable. Finally Pasteur presented glasses of wine taken from the same bottle and still the difference of opinion was equally pronounced, some claiming one and some the other to be better. When the critics learned that they were disputing over wine poured from the same bottle they realized the futility of their objection and opposition ceased. (Life of Louis Pasteur by Valery-Radot. 1885.)

†Rosenau states that "pasteurization as applied to milk consists in heating it at a temperature below the boiling point, followed by rapid cooling." In New York Jacobi had long practiced and taught the wisdom of boiling milk for infant feeding.

objectionable organisms and which should not change its physical properties to any appreciable degree. Many physicians objected to heated milk for children. However, the rationale of the procedure began to be understood, and today there are many sanitarians convinced that all milk for human consumption should be pasteurized. In many cities a large percentage of it is actually subjected to this process.

The advocates of pasteurization base their argument not only on the fact that it destroys pathogenic organisms that may gain entrance to the milk directly from infected cows, as in case of tuberculosis, and indirectly from people who handle it, such as carriers of diphtheria and typhoid bacilli, but also that other objectionable organisms, such as streptococci and the colon bacilli, are destroyed. The recorded results show that where pasteurization is properly done the children thrive upon the milk equally as well,* and some say better, than they do on raw milk and that in addition the specific diseases are prevented. There are those, however, who believe that pasteurized milk tends to the development of scurvy and rickets in very young children. These conditions seem to have occurred when milk was heated much higher than 140 degrees F. The consensus of opinion of those who have used pasteurized milk is that if it is properly pasteurized—that is, not heated above 140 degrees F.—it can be fed with impunity.

There is no doubt that bad results have followed improperly heated milk or that which was not properly handled after heating, but this should not be charged to pasteurization any more than strychnine should be condemned because some individual through ignorance or carelessness takes a lethal dose. The question is, Shall our babies die from infections that come through milk, as in former times; or, shall people responsible for them learn to exercise with care and exactitude methods that will prevent these unnecessary mortalities? For more than twenty years the medical profession has been struggling with this question, but finally the verdict is being pronounced that there is no justification for the death of those who could be saved by the application of reasonable precautions. The demand, is, that for human consumption milk shall be pasteurized, unless properly safeguarded by requirements

*The report for the first eighteen months of the "Milk Station Babies of Washington" shows that the average net gain for all babies, both well and ill, receiving pasteurized milk, was a trifle greater than those receiving raw milk.

such as those demanded for "Grade A raw milk" or by certification. There are sanitarians who believe that even these accepted grades of milk should be pasteurized.

I have pointed out the principle of pasteurization and its application to milk for man with the hope of its being of assistance in the solution of the problem before us. The high mortality among bottle-fed infants, and the numerous and often serious outbreaks of diphtheria, scarlatina, and typhoid fever traceable to milk, rendered it imperative that something be done to safeguard the consumer. The real experimental work in the establishment of the principle of pasteurization of milk has, therefore, been done with the human species. There are, however, questions relative to its physiological effect still to be answered, but they must wait for the results of more general and long-continued use of heated milk.

In applying pasteurization to skim milk and whey for calves exactly the same principle applies as with milk for humans. There is, however, this difference: with the preparation of the food for the child there is a sentiment to offset the extra labor and cost required in taking the necessary precautions that does not exist in the preparation of food for dumb animals. The problem, however, is the same, for we have, to balance the actual extra labor and cost of pasteurization, a reasonable expectation of growing more and healthier calves and pigs.

The difficulty with pasteurization of milk for calves is that people do not understand just what it is, or why it should be done. We are wedded too much to traditional methods. We are told that it is not practical by those who do not recognize that so-called practical men practice the errors as well as the virtues of their forefathers. Difficulties are to be overcome and progress made only by those who seek to know why they do things and also how to do them. To intelligently consider the pasteurization of skim milk and whey as an economic as well as a sanitary question in our dairy industry, it is necessary to inquire into the details and ascertain, if possible, the reasons for it. The answers to the following questions may be of assistance in this direction:

1. What diseases are spread from adult cows to calves through the medium of milk, and to what extent are these diseases actually contracted by this means?
2. What temperature will kill the different pathogenic bacteria that may get into the milk directly from infected cows?

3. Does pasteurized or sterilized milk afford a satisfactory food for calves?

4. Which is the more important, the diseases and losses produced by feeding raw milk, or the expense and care involved in rendering the milk safe?

5. Are there practicable methods of protecting young calves against these diseases other than by pasteurizing or sterilizing the milk?

The experimental work on this general subject has been somewhat limited and consequently reliable data are both scarce and fragmentary. To answer the questions, therefore, we must draw largely from the restricted experiences of individuals, and the established facts concerning the spread of disease-producing organisms, as well as the means for their destruction.

There are a number of epizootics, the viruses of which are spread through the milk. Foot and mouth disease is a good illustration of these. In the recent outbreak of that disease many herds of cattle and swine were infected through separated milk from creameries. While such diseases are not common, they are liable to occur at any time.

The common infectious disease that is known to be transmitted to the calf through the milk, is tuberculosis. The maladies that are believed by many investigators to have the same means of entrance for their viruses are: certain forms of enteritis, white scours, and pneumonia in calves, and infectious abortion in cattle. The germs of other diseases, such as anthrax, may get into the milk of infected cows late in their course.

The extent to which tuberculosis is actually spread through the milk is difficult to determine, but it is known to be very large. I have known on several occasions from 60 to 100 per cent of the calves in large herds fed upon raw milk to react to tuberculin when six months of age. Russell,* of Wisconsin, has pointed out the rapidity with which tuberculosis is spread to the different herds in a community by feeding the calves skim milk from creameries. The almost universal experience of finding growing animals infected when they have been raised on raw separated milk from creameries furnishes additional evidence of the seriousness of this source of infection. The large percentage of reacting cattle that show old

*Russell. Bulletin 143. Wisconsin Agricultural Experiment Station. 1907.

and calcified tuberculous lesions in the mesentery glands points with great definiteness to early intestinal infection. Ostertag* found that badly tuberculous milk will infect when diluted 1 to 1,000,000. This means that one tuberculous udder, among the cows supplying milk to a creamery, could contaminate all of the separated milk taken from that creamery and infect all the calves and pigs fed upon it. It is generally estimated that about 2 per cent of tuberculous cows have tuberculous udders.

The property loss sustained from tuberculosis in cattle was estimated by the Secretary of Agriculture to have cost this country \$25,000,000 last year. As New York has fully 6.5 per cent of the dairy cows of the country, we are within our pro-rata limits in putting our share of the loss at \$1,625,000. In 1908, Professor Willcox estimated that this disease costs our state \$3,000,000 annually. As milk infection is one of the most potent means of spreading the disease, the elimination of that source of infection would greatly reduce the total loss. In addition to this, there are large numbers of pigs that contract tuberculosis by eating infected milk. The condemnations for tuberculosis in swine in the federal inspection last year were 66,023 entire carcasses and 439,915 parts of carcasses. Only about 60 per cent of the hogs are killed under inspection.

Evidence is rapidly accumulating that the cause of the fatal white scours and pneumonia of young calves is largely transmitted to them through the milk. Meyer, Traum and Roadhouse† have described a serious outbreak of infectious diarrhea in calves due to *B. enteritidis* which was controlled by feeding boiled milk.

The investigations that are being carried out at the Veterinary College at Ithaca by Dr. Williams point to the milk as one of the most important sources of infection with contagious abortion. This disease when taken in its entirety, which includes, in addition to the expulsion of the fetus, metritis, premature birth, and sterility, is already recognized as being of at least equal significance with tuberculosis in the losses it occasions. Our investigations are as yet limited, but already Williams has shown that calves raised on raw milk from aborting herds practically all abort in their first pregnancy. The fact that the bacillus of infectious abortion gains entrance to the udder, where it remains for a long time multiply-

*Ostertag. Zeitsch. f. Fleisch und Milch Hygiene. Bd. XV (1904), p. 16.

†Meyer, Traum and Roadhouse. Proceedings of the Am. Vet. Med. Assn. 1915. Jour. A. V. M. A. Mar. 1916.

ing and infecting the milk, has been known but a few years.* The provisions of nature for protecting the viruses of infectious diseases and enabling them to be perpetuated is just beginning to be understood.

In the forthcoming report of the Veterinary College, Williams makes this significant statement:

"We believe it now sufficiently demonstrated that the disease is primarily and chiefly spread through the raw milk fed to young calves. * * *

"The increase of abortion is generally deplored. Yet dairymen and breeders feed milk indifferently from any cow to all calves; or, worse yet, the milk from a diseased cow, which would justly be excluded from the market, and feed it raw to the calves; or, not having a sufficiently virulent abortion in their own herds, they go to a creamery or cheese factory and obtain raw skimmed milk or whey saturated with the most virulent infection, feed it to their calves, and then wonder why, when they are grown, they abort in their first pregnancy. Why should they not abort?"

These findings are quite revolutionary regarding the mode of infection, and if further researches show that they represent the rule, rather than exceptional occurrences, raw milk will be incriminated as the most important disseminator of the virus of this serious disease. It is very important that a thorough investigation of this subject should be made.

The answer to the second question is not difficult, from a practical point of view, although a large amount of experimental work has been done to ascertain the minimum temperature and time at which tubercle bacteria are killed. In the appendix will be found the findings of numerous investigators on this subject. Thirteen experimenters found that tubercle bacteria were killed at a temperature of 140 degrees F. (60 degrees C.) in from ten minutes to three hours. All competent experimenters have found that tubercle bacteria are killed at 140 degrees F. and upward, the temperature depending upon the length of time the heat was applied.

*See article by Moore and Fitch, Report of the N. Y. State Vet. College, Cornell University, 1912-13, for a summary of the findings of abortion bacilli in milk. Evans in a more recent investigation [Washington Academy of Sciences, Vol. V. (1915)] has found the Bang organism to exist in the milk of a larger proportion of cows than previous investigators have done.

The abortion bacillus seems to be less variable, although the number of tests that have been made are not so large as with tubercle bacteria. All of the experimental work reported shows that 140 degrees F. (60 degrees C.) for twenty minutes will destroy it. The temperature that kills the tubercle bacterium will not only destroy the abortion bacillus, but also streptococci, *Bacillus enteritidis*, members of the colon group and other pathogenic bacteria that may get into the milk, with the exception of the spore bearers, such as anthrax.

The results of Dotterer and Breed of the Geneva Agricultural Experiment Station, soon to appear as Bulletin No. 412, are most instructive on the effect of pasteurization of whey on its bacterial flora.* The bulletin also contains valuable information relative to methods of pasteurization.†

The important question, however, is the minimum death point of tubercle bacteria. A careful analysis of the methods employed by those who have experimented on this point seems to show that a temperature of 140 degrees F. (60 degrees C.) for thirty minutes will kill these organisms, provided the milk is covered or properly agitated.* This does not give a sufficient margin of safety when the work is done by those who do not understand the importance of little details. It is believed, however, that with accurate methods it is not necessary to heat the milk higher than 140 degrees F. for thirty minutes. In order to be safe, the law in Denmark requires a momentary temperature of 80 degrees C.

*Milk that is properly pasteurized will have such disease-producing bacteria as those of tuberculosis, abortion, enteritis, etc., destroyed and also many of the lactic acid bacteria and other organisms in the normal flora. Pasteurization, however, will not kill *B. bulgaricus*, or spore-bearing bacteria such as that of anthrax, unless the milk is heated to a high temperature. There are also anaerobic spore-bearing bacilli in milk that will not be killed. If the pasteurized milk is cooled quickly to a low temperature, 45 degrees to 50 degrees F., the bacteria that remain alive in the milk will not multiply. If, however, the heated milk or whey is allowed to stand and cool at room temperature, *B. bulgaricus* will multiply very rapidly, so that after 18 to 24 hours the milk or whey becomes acid, and contains enormous numbers of this organism. The spore bearers and other living bacteria will also multiply.

†The methods that are in use for heating skim milk and whey are as follows: (1) By running a steam pipe into the vat through which the steam is admitted into the milk or whey, until it is raised to the desired temperature; (2) by a double jetting system; (3) by a Victor pasteurizer; (4) by flash pasteurization; and (5) by holding the heated milk.

*T. Smith has shown that if milk is not properly covered, tubercle bacteria will remain alive in the film that forms on the surface of milk when heated at a higher temperature.

(177 degrees F.). The four states in this country requiring pasteurization of dairy by-products have adopted the following temperatures: Pennsylvania, 178 degrees F.; Minnesota, 180 degrees F.; Iowa, 185 degrees F.; and Michigan, 185 degrees F. or 145 degrees F. for thirty minutes. They do not require the milk to be held at the higher temperatures.

The physiological effect of pasteurized or boiled milk is more difficult to determine. Again, the difference in the effect of the heat on whole and skim milk needs to be carefully investigated. The literature shows that if milk is not heated above 140 degrees F. (60 degrees C.) it is not changed in its physical or chemical properties, and I can find no reliable data to show that milk pasteurized at this temperature is not readily digested. The digestive troubles, if any, seem to come when the milk is improperly pasteurized or handled before feeding, or when it is heated to a higher temperature. If milk is to be pasteurized, the process must be complied with. This is not difficult to do, but it requires care and exactness. We should not criticise adversely a method from the results obtained by those who carry it out only in part. The information at hand shows that pasteurized milk can be fed with impunity. Henry and Morrison in their work on feeding state that "patrons of creameries should insist that all skim milk be pasteurized before it is returned to the farm. This precaution keeps the milk sweet and kills the disease-producing bacteria, thereby lessening the trouble from scours and preventing the possible introduction of tuberculosis."

Already at least fifty-five cheese factories are pasteurizing whey and forty-two butter factories or skimming stations are pasteurizing skim milk in this state.* So far as can be learned the patrons of these factories and creameries are pleased. The Geneva Experiment Station has pasteurized the milk for its calves for about ten years with excellent results. In two trials at the Ontario Agricultural College (1899) Dean found that calves fed pasteurized skim milk (heated to 160 degrees F.) made somewhat better gains than others fed unpasteurized skim milk. At the Kansas Station (Bulletin 126) Otis found practically no difference in the feeding value of pasteurized creamery skim milk and that fed directly from

*The 1915 list of the Department of Agriculture gives a total of 716 cheese factories, 234 butter and cheese factories, 290 butter factories and 29 skimming stations.

the hand separator, except that the pasteurized skim milk caused less trouble from scours. Dr. Way, of the Borden Condensed Milk Company, writes:

"We cannot advocate too strongly the efficient pasteurization of all skim milk and whey from milk plants, creameries and cheese factories, where this milk is to be fed to calves and hogs. We thoroughly believe that the future of our dairy herds from the standpoint of health depends largely upon this practice."

Dr. Marshall, State Veterinarian of Pennsylvania, writes:

"For a number of years we maintained a tuberculous herd of pure-bred cattle at the State Farm. The milk from these cows was pasteurized and fed to their calves. Our method of pasteurization was crude but effective; live steam was directed into the tank containing the milk until a uniform temperature of about 160 degrees F. was reached. Calves and pigs thrived on this milk and had no digestive disturbances which could be traced to the use of pasteurized milk.

"At the Pennsylvania State College they have been feeding pasteurized skim milk to calves for more than five years. Professor Larsen states that the calves were thrifty and no digestive troubles were experienced.

"About six years ago the owner of a pure-bred herd in Pennsylvania experienced trouble with tuberculosis in his calves but the mature animals were all free from the disease. Skim milk from a creamery was suspected of causing the trouble. The owner started to pasteurize the skim milk and had no further infections, and no digestive troubles were caused by the pasteurized milk. Other patrons of this creamery adopted the same course and finally equipped a creamery to pasteurize the milk before delivery."

Experiences of this nature are numerous.

There are those who believe the milk should be heated to the boiling point. The temperature insisted upon, from the sanitary point of view, is one necessary to destroy the disease-producing bacteria only. As already stated, by holding and agitating the milk or when these organisms are killed at a much lower temperature than they are when exposed to the heat for but a moment. Which of these methods leaves the milk or whey in a better condition for feeding must be determined by experience or accurately conducted experiments.

The important dietetic question arises when milk is boiled. Rosenau,* formerly of the Public Health and Marine Hospital Service, gives the following list of changes that take place when milk is heated to the boiling point:

Decomposition of the lecithin and nuclein.

Diminution of the organic phosphorus.

Increase of inorganic phosphorus.

Precipitation of the calcium and magnesium salts and the greater part of the phosphates.

Expulsion of the greater part of the carbon dioxide.

Caramelization or burning of a certain portion of the milk sugar (lactose), causing the brownish color.

Partial disarrangement of the normal emulsion and coalescence of some of the fat globules.

Coagulation of the serum albumin, which begins at 75 degrees C.

The casein is rendered less easy of coagulation by rennet, and is more slowly and imperfectly acted upon by pepsin and pancreatin.

Boiling gives the milk a "cooked" taste.

The cream does not rise well, if at all.

When the milk reaches about 60 degrees C., a scum forms on the surface which consists of:

Fatty matter	45.42
Casein and albuminoid	50.86
Ash	3.72

Milk heated in closed vessels does not form a pellicle even when the temperature reaches 100 degrees or 110 degrees C. Milk heated in the open air after cooling forms a pellicle on the surface which renews itself if it is removed. It seems that this pellicle is due mainly to the drying of the upper layer of the liquid. The cream probably does not rise well in heated milk, owing to the increase in the viscosity of the liquid in which it is emulsified.

Whether these changes modify its digestibility for calves to such an extent that it cannot be fed advantageously, must be determined by actual experience. There are conflicting reports on this topic. There is, however, a lack of good experimental data on feeding boiled milk to calves. Mr. Tuttle of the Briarcliff farm

*Pasteurization. Bulletin 56. Public Health and Marine Hospital Service, Washington, D. C.

writes that they have had good results from feeding boiled whole milk to calves after they are from seven to ten days old. Williams recommends boiled milk. Mr. Francisco of the Fairfield dairy writes to "boil the milk." The unfavorable dietetic effects of boiled milk do not appear to be fundamentally serious, otherwise the difficulty with it would be more uniformly reported. Undoubtedly all calves will not thrive on boiled milk; in fact some of them die when fed unheated milk. Williams, in a paper read at the Veterinary Conference at Ithaca, January 12, stated:

"In our experiment animals, and in some other experiments, we have studied the effect of boiled milk. In our own experiment herd, where the degree of infection in most individuals is slight or negative, our calves live well upon boiled milk, and their blood does not react. When we go into other herds however, and attempt to feed calves on boiled milk where parturition has been tardy and where the afterbirth has been retained, the calves very largely succumb to disease during the first few days. If, however, such a calf is started upon raw milk, even though it may be suspicious, and the precautions as to cleanliness above suggested are taken, the tendency to infection in the calf is less marked. The calf is more vigorous and healthy, and in time, according to the clinical observations, it tends to throw off and annul the comparatively small amount of infection which it has received. When the calf has reached eight to ten days of age, the infection may be further repressed by feeding the calf on sterilized milk, which at this age it bears with impunity."

If for economic or sanitary reasons it is found necessary to heat milk to a high temperature, some methods of satisfactorily modifying it will have to be found if it cannot be fed otherwise. It is more likely, however, that efficient means for holding the milk at a lower temperature, where changes that affect its dietetic action do not arise, but where the pathogenic bacteria are killed, will be worked out. If we are to save our calves from infection, we must be prepared to pay the price, which consists of extra labor and the introduction of definite and accurate methods for properly heating the milk. We cannot expect to solve all the problems connected with this great sanitary subject at one sitting. It has often taken years to find true answers to questions of less practical bearing than this.

The question has arisen relative to the pasteurization on the farm of the milk to be fed there. Several dairymen have suggested, and some of these have found from actual experience, that if the calves are allowed whole milk from their dams for from seven to ten days they can then be raised on boiled milk without trouble. The crux of this subject lies in the health of the herd. If it contains tuberculous animals or aborters, it is just as important that the milk be pasteurized, as if it comes from a creamery. Many herds are propagating their diseases because their raw milk is being fed to the calves.

The answer to the fourth question as to whether the diseases caused by raw milk are of greater significance than the labor and cost of pasteurization, should not be difficult. As already stated the annual loss from tuberculosis, white scours, pneumonia, and other diseases in calves, and abortion in cattle, due to infection from raw milk, is very heavy. All progress and the utilization of all preventive measures have their price, which must be paid in care, labor, money, or in all three. With many of our herds barely able to perpetuate themselves because of their diseases; with the extinction of many valuable strains threatened because of them; and with the possession of definite knowledge of the means by which these infections spread through the milk to other herds, are we justified longer in not living up to the knowledge that has been given us and in doing what we can to stop the destruction? Should we hesitate to expend a little money to adjust our methods in such a way that these heavy annual losses may be prevented and our cattle industries saved? Which is better for our dairymen and for the state, to pay a small amount directly for equipment and labor to prevent these diseases, or to sustain the losses caused by them? The cost to the state last year for foot and mouth disease contracted through unpasteurized milk alone, would pay for a suitable equipment for a large part of the creameries and factories in the state.

The number of cattle raisers who are voluntarily pasteurizing or boiling the milk fed to their calves, because by so doing they are obtaining better results, is increasing rapidly. This would tend to the conclusion that as an economic question it pays. Further, the heavy losses from disease among food-producing animals are having their effect upon the price of meat. The passing away of the ranges is forcing more and more our beef production within the influence of the dairy herd. Milk is one of the most valuable

foods that we possess, and further, it is among the cheapest. When our dairies are composed only of healthy cattle, and people are assured that the milk is safe, the quantity consumed will be wonderfully increased, with a corresponding reduction in the cost of living. This, like many other economic questions, will be settled eventually from experience. The choice of action is clear. We must do one of two things, namely, either prevent the diseases transmitted through the milk or bear the losses they occasion.

The question has been asked whether or not there is any other method than the pasteurization or boiling of milk to render it safe for feeding healthy calves. For the milk of infected herds, I believe not. If infected milk is to be utilized by feeding, it should first be rendered safe. There is at present no other safe method known for destroying pathogenic organisms in milk to be fed than by heat. With cattle, however, the only serious result of raw milk is the transmission of the germs of the diseases from which the cows themselves suffer. There seems to be little or no danger from the organisms that may be transmitted to them from the attendants through the milk. At present, therefore, we know of no reason why, for sanitary purposes, milk from perfectly healthy cows should be heated before being fed. When the herd is sound, its milk can be fed raw.* When all of the herds are healthy, mixed milk can be fed in the same way. The aim should be to build up sound herds, for it is the herd that forms the unit to deal with, whether in the sale of animals or in the use of their products.

I have tried to point out the essential elements of danger in the spread of infectious diseases through the use of raw milk from infected dairies, and the importance of adopting measures to prevent the perpetuation of such diseases. For the correction of the difficulties that have arisen there must be continued study, care, and patience. A large amount of experimental work will undoubtedly have to be done. The losses which our dairymen are now sustaining will disappear when they learn to care for their animals in such a way that the sources of infection naturally provided for the propagation of these diseases will be cut off.

*This does not apply to milk for human consumption. One of the essential reasons for pasteurization is to protect the consumer against the infection of the milk from attendants and those handling it who may be carriers of typhoid or other pathogenic bacteria.

APPENDIX

SHOWING THE RESULTS OF EXPERIMENTS ON THE THERMAL DEATH POINT OF TUBERCLE BACTERIA

Author	Year	Temperature and Time	Results
de Man (g), 1.....	1893	60° C. (140° F.), 1 hr	Kills
Smith, T., 2.....	1899	60° C. (140° F.), 20 min.	Kills
Farrington & Russell, 3.....	1899	60° C. (140° F.), 60 min.	Kills
Russell & Hastings (a), 4.....	1900	60° C. (140° F.), 10 min.	Kills
Morgenroth, 5.....	1900	55° C. (131° F.), 3 hrs.	Kills
Hesse, 6.....	1900	60° C. (140° F.), 15-20 hrs	Kills
Hesse, 7.....	1901	60° C. (140° F.), 20 hrs.	Kills
Russell & Hastings (a), 8.....	1903	60° C. (140° F.), 15 hrs.	Kills
Hippins, 9.....	1905	60° C. (140° F.), 1 hr.	Kills
Freeman, 10.....	1907	60° C. (140° F.), 40 min.	Kills
Schroeder, 11.....	1910	60° C. (140° F.), 20 min.	Kills
Rosenau, 12.....	1910	60° C. (140° F.), 20 min.	Kills
Anderson & Rosenau, 13.....	1910	60° C. (140° F.), 20 min.	Kills
Freeman (b), 14.....	1910	60° C. (140° F.), 40 min.	Kills
Schorer & Rosenau, 25.....	1912	60° C. (140° F.), 20 min.	Kills
Bitter, 16.....	1890	68°-69° C., (153.5°-156.2° F.), 30 min.	Kills
Foster, 17.....	1892	70° C. (158° F.), 5-10 min	Kills
Freeman, 15.....	1898	68° C. (153.2° F.), 30 min.	Kills
Oppenheimer, 18.....	1899	70° C. (158° F.), 30 min.	Kills
Michigan Experiment Station, 19.....	1899	68.3° C. (155° F.), 20 min.	Kills
Farrington & Russell, 3.....	1899	68.3° C. (155° F.), 15-20 min	Kills
Morgenroth, 5.....	1900	70° C. (158° F.), 10-30 min.	Kills
Bang, 20.....	1901	65° C. (149° F.), 5 min.	Kills
Bang, 20.....	1901	70° C. (158° F.), Momentary	Kills
Marshall, 21.....	1901	68°-70° C. (153.5°-158° F.), 20 min.	Kills
Levy & Bruns, 22.....	1901	65°-70° C. (149°-158° F.), 15-20 min.	Kills
Bang & Stribolt, 23.....	1905	65° C. (149° F.), 5 min.	Kills
Schroeder, 11.....	1910	70° C. (158° F.), 10 min.	Kills
Schorer (b), 24.....	1912	62.77° C. (145° F.), 30 min.	Kills
Schorer & Rosenau, 25.....	1912	62-77° C (145° F.), 30-45 min.	Kills
Minnesota Bulletin, 26.....	1912	65° C. (149° F.), 20 min.	Kills
Denmark (c), 28.....	1898	85° C. (185° F.),	Kills
Hammond, 27.....	1900	71.1° C (160° F.), 15 min.	Kills
Morgenroth, 5.....	1900	100° C. (212° F.), 3-5 min.	Kills
Marshall, 21.....	1900	85° C. (185° F.), Momentary	Kills
Barthel & Stenström, 30.....	1901	80° C. (176° F.), Momentary	Kills
Bang, 20.....	1901	75° C. (167° F.), Mementary	Kills
Denmark (c), 28.....	1904	80° C. (176° F.), Momentary	Kills
Barthel & Stenström, 29.....	1904	80° C. (176° F.), 1 min.	Kills
de Jong, 31.....	1908	Milk must be sterilized or cooked.	
van der Sluis, 32.....	1909	80° C. (176° F.), Necessary	Kills
Minnesota Bulletin, 26.....	1912	80° C. (176° F.), 5 min.	Kills
Havner, 33.....	1913	77.4° C. (175° F.), 5 min.	Kills
Michigan Agric. Exp. Station, 19.....	1899	60° C. (140° F.), 10 min.	Did not kill
Russell & Hastings, 4.....	1900	60° C. (140° F.), 5 min.	Did not kill
Galtier, 34.....	1900	75° C. (167° F.), 20 min.	Did not yill
Galtier, 34.....	1900	85° C. (185° F.), 6 min.	Did not kill
Tjaden, Koske & Hertell, 36.....	1901	98° C. (208.4° F.), Momentary	Did not kill
Valagussa & Ortona, 37.....	1901	80° C. (176° F.), Exposure to	Did not kill

Author	Year	Temperature and Time	Results
Morgenroth, 5	1901	55° C. (131° F.), 2 hrs.	Did not kill
Bang, 20	1901	60° C. (140° F.), 15 min.	Did not kill
Barthel & Stenström (e), 38.....	1901	65° C. (149° F.), 20 min.	Did not Kill
Rullmann (f), 39.....	1903	65° C. (149° F.), 30 min.	Did not Kill

(a) Milk covered and agitated during heating process.

(b) Milk covered during heating process.

(c) The Denmark law was revised in 1903 and again in 1904 by requiring the products to be heated to 80° C., and adding to these cream used for the manufacture of export butter. The law also requires a pasteurization of 80° on milk and buttermilk to be imported.

(d) Milk not covered or agitated during heating process.

(e) The milk was from udders in last stage of disease and had suffered great physical and chemical changes.

(f) Was agitated constantly during pasteurization.

(g) The standard temperatures that have been most commonly accepted up to the present time (1900) are those of de Man (*Arch. f. Hyg.*, 1893), who worked with broken-down semi-fluid cheesy matter derived from tuberculous udders. They are 55° C. (131° F.) for 4 hours, 60° C. (140° F.) for 1 hour, 65° C. (149° F.) for 15 minutes, 70° C. (158° F.) for 10 minutes, 80° C. (176° F.) for 5 minutes, 90° C. (194° F.) for 2 minutes, and 95° C. (203° F.) for 1 minute.

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PRESERVATION AND IN SITU FIXATION OF VETERINARY ANATOMICAL SUBJECTS BY INTRAVASCULAR INJECTION

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Although *in situ* fixation of anatomical material by intravascular injection has been well established in some few veterinary colleges in this country for more than a decade, nothing relative to the history, technique or advantages of the method has appeared in our periodical literature. This fact and numerous inquiries regarding the technique have prompted the writer to deal with this subject somewhat in detail in the hope that the same may be of value to those more directly concerned and of interest to those in our profession whose vivid memories of the dissecting room are of "soft" material only.

Although the writer has personally supervised the injection of approximately 150 horses, 30 dogs, 12 cows, 12 sheep and 10 pigs during the past six years, he assumes no credit whatsoever for the method, the same having been well established in this department even before his matriculation as a freshman.

It is universally accepted, I believe, that gross anatomy is one of the most important, if not the most important, of the foundation subjects in veterinary education. *In situ* fixation by intravascular injection has not only revolutionized our knowledge of some parts of this subject but it has made possible a much more nearly ideal method of teaching the same. The history of affairs in human anatomy was identical in this respect.

For convenience as well as clearness the writer desires to treat the subject under the following divisions: history, equipment, technique and advantages of the method.

HISTORY: In the fall of 1901, Professor Septimus Sisson came to the College of Veterinary Medicine, Ohio State University, to fill the chair in gross anatomy. Having received his undergraduate anatomical training in the Ontario Veterinary College on "soft" material and having later demonstrated for eight years on the same in that institution, he was quite familiar with the many disadvantages of using non-preserved or unfixed cadavers in the dissecting

room. Since intravascular injection for fixation and preservation was then being used in some medical colleges and had been used by Dr. Sisson very successfully on the smaller animals in the Kansas State Agricultural College in 1889 and 1900, he determined to try the same method, using formalin, on the large animals. So successful was he on horses and so satisfactory were the results, to both instructor and students, that the method was perfected and adopted as the regular practice for the preparation of all animals used for dissection and for frozen sections. From time to time this practice, modified somewhat in some cases, has been adopted in most of our veterinary colleges.

EQUIPMENT: To carry out the method with which the writer is most familiar and which he believes most satisfactory, one will find it necessary to have the following equipment or its equivalent: One set of English hobbles; two large scalpels; two pairs of large hemostats; one pair scissors; one cannula ($\frac{1}{4}$ inch for horse) preferably with an "olive" at each end; three feet of heavy cord (chalk line); one "head" chain; one "rump" chain; two one-half ton chain hoists; rings in the ceiling or an overhead track for suspension; one large needle; one large (20 gallon) galvanized iron tank with pipe leading down to the embalming room equipped with a small basin cock; rubber hose ($\frac{1}{4}$ inch) sufficient to reach from end of the pipe to the subject; two boards notched with a V at each end, to be used as spreaders for the limbs.

Most of the equipment is shown in the accompanying figures and reference to these will enable the reader readily to understand the technique.

TECHNIQUE: The following is the procedure indicated for injection of the horse and the necessary modifications for the other animals will be mentioned thereafter.

It has been the practice of the writer to first prepare the fluid to be used for the preservation and fixation. Twenty gallons of a fifteen per cent. solution of formalin are usually made up in the tank. Good results are obtained in favorable weather from the use of a ten per cent. solution and in some cases where distribution was excellent a five per cent. solution gave very satisfactory results. In some cases where subjects were to be used for a long period during hot weather a twenty per cent. solution was used.

Stand the subject near a drain in the embalming room; put on a strong halter and the English hobbles (king hobble on the right

thoracic digit). It is desirable when casting on cement floor to have three persons if possible; one holding the head "close", one directly behind the animal, and a third to gently "take up" the hopple chain. In this manner the animal can usually be made to "sit down", from which posture the desired recumbent position is easily secured by pushing him over on his *left* side. The writer has tried casting on a truck or other methods but none has proven so satisfactory as the above, which in one hundred and fifty cases has led

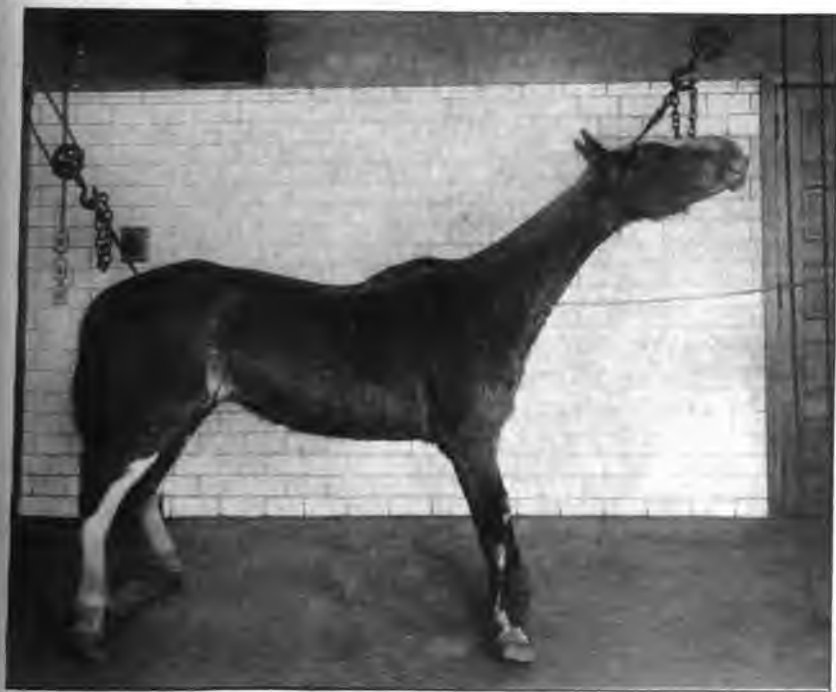


FIG. 1. Showing the method of suspension, the chain hoists, the angles at which they are placed, the "head" and "rump" chains, the limb spreaders, the incision to reach the carotid artery, the cannula and the rubber tube extending to same.

to no accidents. With the four feet drawn closely together and secured and an assistant on the head, the operator takes his position on the dorso-lateral aspect of the neck.

In the posterior half of the jugular furrow make a longitudinal incision about four inches in length through the skin and cutaneous colli muscle. This will expose the jugular vein which is, of course,

to be avoided by pushing to one side. Locate the carotid artery and separate it from the connective tissue and adjacent nerves, avoiding damage to the latter and to any small collateral arteries present. Draw the artery to a more superficial position in the opening and apply the two large hemostats to it about three inches apart. With a sharp scalpel make an incision one and one-half inches long on the superficial aspect of the artery. Removal of the two forceps allows the free bleeding of the animal. In order to avoid clogging of the drain by the coagulation of the blood it is advised to have water running on the floor from a hose close to the carotid incision. As bleeding proceeds the animal is usually inclined to struggle more or less which in turn induces more complete bleeding. In cases where a low vitality is apparent and probability of a thorough bleeding is doubtful, a hypodermic of strychnia may be given just previous to casting. The general stimulant increases heart action and usually ensures satisfactory exsanguination.

Casting the subject on the left side and using the *right* carotid artery for bleeding and injection is preferable in order that the relations of the oesophagus be not disturbed.

As soon as the animal is dead, the head and the rump chains are to be placed, viz: The two hooks on the head chain, which is Y shaped, are to be passed from above downward and outward in the temporal fossa under the zygomatic arch on either side of the head; and the rump chain, provided with one large hook is placed under the last sacral segment. In order to insert the hooks a small incision through only the skin and deep fascia is necessary.

Connect the lower hooks of the chain hoists with the head and rump chains respectively and proceed to raise the animal to a position as nearly in imitation of the standing posture as is possible. With the board "spreaders" placed to separate the limbs (as shown in Fig. 1) the four digits should just touch the floor. The limbs are spread to facilitate the dissection of the pectoral and medial femoral muscles. If, however, the subject is to be used for frozen section work or for special topographic purposes it is no doubt preferable to have them in as near normal standing position as is possible. Suspension in imitation of the natural standing position, is in the writer's judgment, preferable to fixation on the back or on the side, as practiced by some. Too much distortion and flattening of the muscles occurs in the latter positions. The writer quite successfully hardened one horse with the head in flexion by suspending with three hoists, the third being fixed at the withers.

Connect one end of the rubber tubing to the hose cock on the end of the fluid pipe and the other to the cannula, applying strong ligatures about both. Turn on the fluid sufficiently to fill the horse, forcing the air out of the latter and also to determine accurately how far the valve should be opened to permit only a very small but constant stream to pass through the hose. Insert the cannula into the carotid artery through the incision previously made directing the former toward the heart. Securely ligate the artery about the cannula and also ligate the artery just in front of the incision.

Open the valve in the fluid pipe only enough to allow a small stream to gravitate into the subject. Very undesirable results have been obtained in a few cases where an assistant turned the valve entirely open, causing too great a pressure in the vessels with a rupture into the lungs, evidenced by fluid running out of the nostrils and mouth before the tissues were filled. The tank the writer uses is placed on the second floor above the embalming room (approximately twenty feet) which distance gives considerably more gravity pressure than is necessary. A height of eight feet should be sufficient.

As soon as the injection is started it is advisable to see that the tongue is in its normal position and to fasten the lips together by one stitch through the center of each. The mouth may be hardened partially opened, if desired, by placing a small two-inch block between the incisor teeth.

While the fluid gravitates into the subject, the operator should *constantly* observe the distribution of the fluid as determined at first by the twitching of the various muscles and later by the pressure in the larger veins—jugular, facial, cephalic, external thoracic and saphenous. These indices should be noted often and whenever an appreciably great distention of the same occurs, the fluid should be turned off temporarily. Otherwise a pulmonary rupture is quite probable, for in the type of horses used for anatomical work pulmonary emphysema and other like conditions are quite common.

Good distribution rather than mere amount of the injection is more to be desired. Usually the fixation or contraction of the muscles takes place first in the withers, prescapular region and thoracic limb, followed by either the head and poll or the pelvic limb. Palpation of the tongue may be used as an index as to the fixation of the head, for it has been the writer's observation that

in older subjects the muscles of the cheeks, nostrils and lips are often rather slow in hardening. Usually in the heavy musculature of the thigh, especially the biceps, semi-tendinosus and semi-membranosus, distribution and fixation are slow to completion.

While the distribution and fixation are being determined on the subject, the amount of the injection can be noted on a gauge within the view of the operator. Its construction is simple—a light chain extends from a float block within the tank up over a pulley and then down into the embalming room, a small weight on the bottom of the chain is raised as the fluid gravitates into the subject. If mathematics fail one in figuring out the scale, empiricism may be employed by drawing out a gallon at a time and marking the gauge accordingly.

When a pulmonary rupture occurs the operator may safely assume that no further injection of any value is possible. To prevent this accident it is advisable not to continue the injection until the fluid is seen to escape through the nostrils or mouth or both, if the arteries are to be later filled with a colored mass injection for the study of angiology or topographic anatomy. In such cases it is advisable to discontinue the gravitation of the fluid when distribution and hardening are satisfactory and the amount of the injection is sufficient to insure preservation. Otherwise the fluid may be shut off permanently when in the operator's judgment the animal is completely embalmed.

Our experience has shown that it is inadvisable to disturb or work on the subject in less than twenty-four hours after the injection is completed. Two to four days are even better. If the subject is not to be used for a week or more it is advisable to wrap the face and the limbs below the carpus and tarsus with moist towels or sacks to prevent drying, since here the subcutaneous structures contain a minimum of moisture. Continuance of the same until the student comes to the dissection of these parts is a good practice.

The following table gives a record of thirty-four horses injected by the writer and used for dissection in the Ohio State University:

ANIMAL	WEIGHT (estimated)	AMOUNT OF INJECTION
1—Black mare	800 lbs.	13 gals.
2—Bay mare	750	11
3—Gray mare	800	12.5
4—White gelding	1000	16
5—Black gelding	800	13.5
6—White mare	1050	17
7—Sorrel mare	900	15
8—Black mare	900	15
9—Sorrel gelding	1050	17.5
10—Bay pony mare	800	10
11—Black mare	1250	20
12—Bay gelding	1050	17
13—Black gelding	1250	22
14—Sorrel mare	1050	17.5
15—Black gelding	1100	17
16—Tan pony mare	800	16
17—Bay gelding	1150	16
18—Sorrel mare (2 yr. old)	750	22
19—White gelding	1350	21
20—Bay gelding	1350	17
21—Tan mare	700	11
22—Black mare	950	7
23—Black gelding	1100	14.5
24—Sorrel mare	1000	16
25—Black gelding	900	11
26—Gray gelding	800	11
27—Bay pony mare	600	9
28—Sorrel mare	900	15
29—Brown mare	800	10.5
30—Black gelding	800	14.5
31—Gray gelding	1100	26.5*
32—Sorrel gelding	700	10
33—Bay pony mare	550	7.5
34—Sorrel gelding	750	11.5

*Number 31—Gray gelding, had a rupture of a blood vessel during injection resulting in the escape of approximately four or five gallons of the fluid into the pleural cavity.

From the above table the average weight of the subjects used is found to be about 925 lbs., and the average amount of fluid injected 14.5 gallons or approximately 1.5 gallons per hundred weight. To make up 14.5 gallons of 15 per cent. formalin solution 2.175 gallons of commercial formalin are required, which at \$.90 per gallon gives us the cost of injection per average head—\$1.95.

In the preparation of the other animals the writer wishes to briefly state that the same technique is followed out with certain minor modifications. The ox is cast with the single rope method and embalmed standing, a rope around the horns being used in preference to the head chain, whenever possible. It has been our practice to use the femoral artery rather than the carotid for the bleeding and injection of the smaller animals—sheep, dog or hog. As soon as bled these animals are placed in a 90° trough, properly

padded in each case to prevent distortion and flattening, and in this position injected.

Not infrequently it has been our practice to make special preparation of certain organs *previous* to the intravascular injection and *in situ* fixation. To distend the stomach in the horse or dog a 5 per cent. solution of formalin is permitted to gravitate into the organ by means of the rubber tubing being passed *per os* into the oesophagus. The same is sometimes done in the ox to prevent post-mortem fermentation of stomach contents. To demonstrate the more nearly normal size and relations of the lungs a rather thick aqueous solution of corn starch is gravitated by means of a tube passed far down the trachea through a tracheotomy incision in the usual location, or the tube may be passed *per os* through the *aditus laryngis*. A common irrigating can and tube are very satisfactory for this particular work.

To prepare the blood vessels for topography or for angiography the arteries alone need to be injected since the veins retain enough blood or enough discoloration to make them easily located. The material we use for the injection of the arteries is an aqueous solution of corn starch (two lbs. to the gallon) thoroughly stirred with dry red oxide of lead added until the desired color is obtained. For one subject a three gallon quantity is mixed and the amount used may be estimated at slightly over two gallons. The injection of the red mass is most satisfactory about twenty-four hours after the intravascular injection of the formalin. By that time the pressure in the arteries has subsided and much less resistance to the passage of the mass is encountered. Reference to Figure 2 will adequately explain the equipment used in this procedure.

The pump is an Allen's Rotary Surgical Pump, which forces a slow and small stream. An assistant should constantly stir the mass to prevent the starch setting in the container. To secure the most satisfactory results the operator must force only a very small but constant stream into the vessels. To attempt rapid injection results often in a rupture either into the lung or into the pleural cavity. To use the pump intermittently often results in the starch setting in the hose or in the carotid artery preventing further injection in some cases. If after the injection of the red mass is begun, a distention of the veins occurs as a result of the formalin solution being forced over from the arteries, one may perform

phlebotomy on the jugular, cephalic, external thoracic and saphenous veins to lessen the back pressure in the arteries. When successful in the use of the red mass injection even very small arteries, the size of a thread, are well brought out. The starch and red lead mass are, in our judgment preferable to others, for soon after injection it becomes almost solid and when cut into offers no resis-

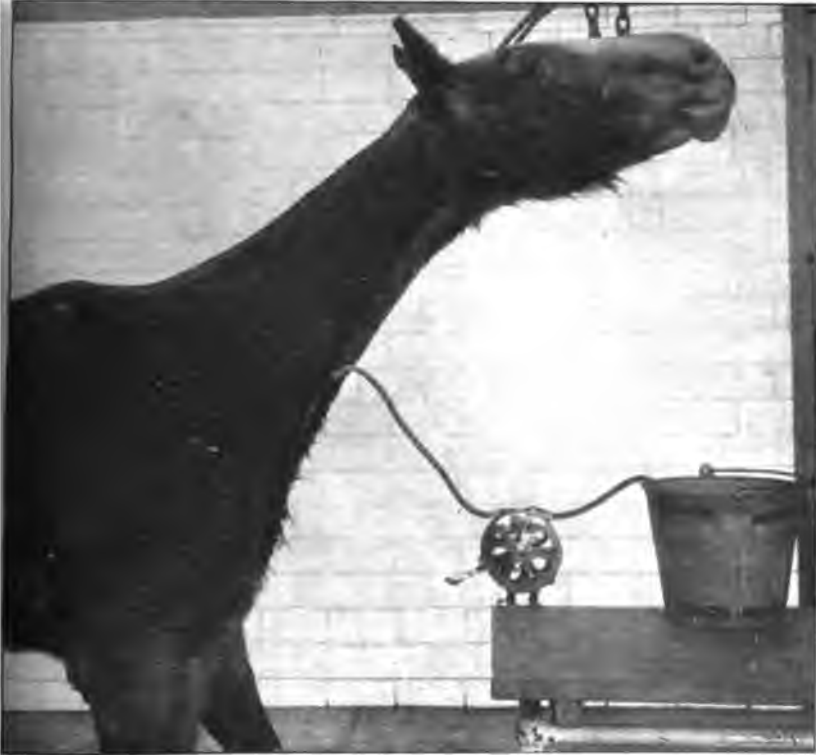


FIG. 2.

tance to the knife, nor does it diffuse into or stain the tissues. The insolubility of the red lead makes it preferable to carmine or other substances used to secure the color.

ADVANTAGES. . . The advantages of preservation and *in situ* fixation of veterinary anatomical material are manifold to the anatomist, student and the profession alike. Since the writer has never had experience in the dissection of non-preserved subjects, he has made numerous inquiries of men older in the profession, whose

undergraduate anatomical training was on "soft" material and whose opportunity it has since been to observe the present teaching methods and dissecting room material made possible by preservation and fixation. From these men the writer has received sufficient information, he believes, to permit his making some comparisons, which are not superfluous when we realize that there still exist in veterinary educational circles a few loyal advocates of "soft" material.

At a banquet, recently, one of our most prominent and most widely known teachers of veterinary medicine gave the following brief summary of his experience in the dissecting room:—"When I was in school we did not have the advantages of embalmed subjects in anatomy. We dissected only during cold weather and even then our dissection was the most rapid thing of that age. We brought a cheap horse into the laboratory, bled him, and after placing him on a large table went to work. Since economy was the keynote in practically all veterinary education at that time, we were required to remove the skin which the college sold. A retention of the abdominal viscera meant an extremely rapid decomposition, so we made hasty dissection of the abdominal wall and eviscerated the animal. Removal of the skin and viscera required the entire first dissection period and since the subject was in an advanced stage of decomposition by the end of the first week, we had only four or five laboratory sessions for a dissection. While few of us got very far in anatomy, a multitude of horse skinners was developed."

It is the writer's belief that an enumeration, with a minimum of discussion, of the advantages of preservation and fixation is sufficient, since those now opposed to the same are decidedly in the minority.

To the student, this material offers an opportunity to make uniformly accurate, thorough and complete dissection and study of every part of the subject, for no time and limit is fixed by the decomposition of the tissues. It permits dissection in the laboratory heated to a comfortable temperature in the winter and a properly preserved subject may be kept for a long period during the extremely hot weather of mid-summer. An advantage is here noted over the material offered for the dissection of man, since one need not take animals after death, but before. It further permits dissection during the full academic year, and although the average

regular time for a part is about five weeks it is true that the first assignment for freshmen extends over seven weeks, often.

Considering the sanitary phase, one may say that proper preservation reduces to a minimum the opportunity for infection in the anatomical laboratory. In nine years observation the writer has not seen a single infection from material prepared as above described. It precludes the possibility of the offensive odor of decomposition and the inhalation of the ever-present poisonous gases from non-preserved material.

To express the point of view of the anatomist and scientist, the writer desires to quote from the preface of the first edition of, "A Text Book of Veterinary Anatomy," by Septimus Sisson:—"The study of frozen sections and of material which has been hardened by intravascular injection of formalin has profoundly modified our views concerning the natural shape of many of the viscera and has rendered possible much greater precision in topographic statements. The experience of the author during the last ten years, in which almost all material used for dissection and for frozen sections in the anatomical laboratory of this university has been hardened with formalin, has demonstrated that many of the current descriptions of the organs in animals contain the same sort of errors as those which prevailed in regard to similar structures in man previous to the adoption of modern methods of preparation."

In closing the writer desires to express his indebtedness to his former teacher and colleague, Professor Sisson, for training received in the subject discussed and for the two photographs from which the above views were made.

An outbreak of trichinosis occurred in Far Rockaway Borough of Queens in April, which was remarkable in that the mortality was very high for this disease and that the diagnosis was for sometime obscure. Twelve patients were treated, everything being done for them therapeutically, that was possible, but four of them died, a mortality of 33 1/3%.

The source of the infection appears to have been a pig slaughtered about January 1. The exact method of preparing the food is not clear, but cooking played a very small part in it.—*Bulletin of the Department of Health, New York City.*

VETERINARY FACULTIES AND STATE EXAMINING BOARDS*

S. STEWART, Kansas City, Mo.

The attendance at our New York meeting was the greatest numerically in the history of this organization, and the number of College Faculties, also the number of State Boards represented, exceeded that of any previous meeting. The records show that 13 College Faculties out of a total of 23, and 21 State Examining Boards, out of a total of 36, participated in the session of that meeting. This majority representation and participation cannot but be looked upon as substantial evidence of the wide-spread interest in the work before us, and affords the assurance of the intrinsic merits of our purpose, and an early solution of some of the pressing problems.

During the past two years there have been few changes in the directing officers of the several veterinary colleges. Quite in contrast to this there have been many changes in the personnel of the State Examining Boards. Of the 36 boards established at the time of our meeting, 4 have been entirely changed in membership, while in 20 of them the membership has been changed in greater or less proportion. Four new state boards have been organized since our meeting, and it appears that all of those charged with the responsibility of determining the fitness of candidates for license to practice, about one-half of them had no experience previous to two years ago, and some of them have yet to officially take up the work before them. If this record is to serve us as a criterion of what to expect in the future, then it must be very evident that if some degree of uniformity shall be maintained, and some progress made from year to year, it is high time that we correlate the work already done and crystallize it into definite form, also see to it that it is published, that the various board members may have a reference which is dependable, and become familiar with that which has heretofore been accomplished. If the experience and records of the various state boards can be gathered together and arranged in definite form, data will be thus supplied of incalculable value in the cause of better veterinary education.

*Address of the President of the Association of Veterinary Faculties and State Examining Boards of North America, Sept. 1915, Oakland, Cal.

As the result of a personal correspondence with the officers of the various State Boards of Examiners, I have no hesitation in affirming that state boards generally, will be very glad indeed to avail themselves of reliable data concerning the findings of other boards, and would be glad to adopt the methods of other boards which experience has proven to secure the best results; which has provided a satisfactory manner of determining whether a candidate for license to practice really possesses the kind and degree of knowledge which will make him a useful member of the profession.

The final judges as to whether or not the graduates of our colleges have been sufficiently trained before they are granted a veterinary degree, are the members of the various State Examining Boards, hence if the examining boards can establish a substantially uniform examination, and a practically uniform method of graduation, the colleges will have some general guide and will most certainly be stimulated to correct any defects, and to supply any omissions in the courses of instruction given therein.

During the last meeting, and in compliance with a resolution, a committee was appointed for the special purpose of collecting data relative to the variability of state board examinations, and as to the successes and failures of candidates appearing for license to practice before the various state boards. It was the opinion expressed that if this data indicated also the colleges from which the successful and unsuccessful candidates were graduated, with the dates of graduation, that the information would be of material value to the colleges, serving as a guide to make the instruction include subjects which State Board Examiners deemed of material importance to those who should be granted a license to practice.

The personnel of the committee above referred to consists of: O. L. Boor, Secretary of the Indiana State Board; J. T. Seeley, President of the Washington State Board; E. W. Babson, Secretary of the Massachusetts State Board; Thos. Downing, President of the Iowa State Board, and M. Jacobs, Secretary of the Tennessee State Board. This committee, made up entirely of members of State Examining Boards, have the personal relationship and wide experience which should enable them to bring to this meeting much well digested material for our consideration, and I have no doubt will be able to establish some standards which will serve to guide us in our further work, each in his own particular field. Those who attended the New York meeting could not but be impressed with the virile

quality of the papers presented, and by the animated and intelligent discussion given to each of them as presented. The report of said meeting as incorporated in the 1913 annual report of the A. V. M. A. is a splendid commentary on the most excellent service rendered by our secretary, Jacob Helmer. The discussions were quite extensive and the careful editing of the same has made this printed report of permanent value. Should there be any member of this organization who is not a member of the A. V. M. A., and not in possession of the report of that organization for 1913, I advise that he procure a copy of said report from the association's librarian, for the advantages which will come to him through securing the portion relating to this organization. The expense of procuring bound separates of that portion of the A. V. M. A. report of this meeting relating to this organization, in numbers sufficient to meet our needs, will not be large, and I recommend that the secretary be instructed this year to arrange for same. There are probably not more than 150 members of state boards who are not members of the A. V. M. A. and who may not desire to purchase copies of the report of that organization, but who would gladly read the report of our doings that they might be better informed concerning the problems before this organization. It is better for the cause to supply every member in this manner, and thus make his cooperation on the basis of fullest information.

Enterprising publishers have been on the lookout for copies of state board examinations, with the view of supplying applicants for state license with lists of questions and answers thereto. Several members of this organization expressed themselves adversely, last meeting, to supplying such list of questions, but since our meeting there has appeared on the market a volume of 395 pages issued from the press of J. B. Lippincott Company, and in the preface of this book the reader is led to understand that it represents the scope of State Examiners' questions, as well as supplying acceptable answers thereto. Further, it purports to furnish students a compendium on the several branches which they are studying in college, and to supply applicants for license to practice the information whereby they may make adequate preparation to pass state board examinations, yes, even more, it suggests that the volume might serve as an encyclopedia of veterinary knowledge for the busy practitioner.

While the author modestly disclaims perfection in the text, and asks for suggestions that subsequent editions of this work may be more valuable, it is not quite clear how said author can absolve him-

self from responsibility for the numerous errors contained therein. A careful scrutiny of the answers supplied to the various questions reveals the fact that many are faulty and some are erroneous. The student or practitioner who makes use of the same cannot but be led astray in many places. It is very easy for one to imagine that a man, out of college for a number of years and who has not been a careful student of veterinary medicine since leaving college, might read the answers given and not be impressed that they were seriously awry anywhere, but those, who have kept abreast of the times and who are familiar with some of the subjects under consideration will readily observe the faulty and misleading statements made. They will appreciate how far astray the student or practitioner might be led through the inaccuracy of many of the answers. Certain it is that State Board Examiners should be more critical than have been the authors of the answers found in this book.

Again, the student and the graduate preparing for examination will have reason to believe that the question found in this book represent the scope of any examination with which such person is likely to be confronted, and this fact must make very plain to you, that an adequate examination must be wider than a written examination embodying such questions. During the meetings heretofore the problem has been presented, time and again, relative to the making of examinations broad in scope as well as practical in character. Such examinations should include tests or detailed descriptions of tests for disease, as applied to the living animal, to also include the identification of materials to be used. The usual adverse argument has been that State Board Examiners could not afford to take the time for, nor incur the expense of practical examinations.

In states where a comparatively large number of applicants, for license to practice, appear at each meeting of the board, it is very evident that more time will be required to make a practical examination than is now consumed in a purely written one. When the number is large, then the return in fees is proportionately large, and it would seem as though the interests of the state being served by a board would not only warrant, but demand that additional time and expense be incurred for this service. If there be but a small number of applicants, then the extra time required is very limited indeed, and the practical features of an examination would be a small tax upon both time and funds. For instance, if there were but 10 applicants, only a few hours need be consumed in an additional prac-

tical examination, and certainly there could be no large expenditure for facilities for such examination. A board could arrange for the use of a variety of animals at a nominal cost, and members could easily, from their own equipment, supply needful apparatus and materials to make practical tests of the knowledge of applicants, along a number of lines. Specimens of commonly used therapeutic agents could be employed to ascertain whether or not they are recognized readily and to make positive the applicant's knowledge of how to properly use the same. Why should not the board require an applicant to demonstrate how to examine an animal for specified diseases; how to conduct a clinical diagnosis, as for instance, for cardiac or pulmonary diseases; to manifest actual knowledge of anatomy by pointing out the position of specific structures; to decide whether or not an animal examined presented normal or abnormal conditions and state the basis of decision? In fact why should not the board really ascertain whether or not applicants have a workable knowledge and may be safely trusted by owners of live stock, in matters veterinary?

We are assembled to accomplish, if possible, a definite object, the establishment of a uniform or nearly uniform examination for licenses to practice Veterinary Medicine and Surgery. In previous meetings, it has been pretty thoroughly set forth through the papers presented and discussions thereon, that if this can be accomplished there will be little to interfere with the right of the licensed practitioner enjoying the privileges of his profession in any part of this great country, without being obliged to establish anew his fitness when conditions make it essential or desirable for him to live in another state, or successively, several other states. While reciprocity between state boards is the object sought, incidentally the cause of veterinary education is involved, and any standard of examination established by the combined state boards must necessarily become a standard by which veterinary colleges will be guided. The colleges must prepare their students to meet this standard or lose the confidence of their supporters.

Any standard fixed by this body will determine the minimum in scope and practicability of veterinary instruction, hence it is very easy to understand the influence our deliberation and action or non-action will have over an advance upward in veterinary education. I sincerely trust this, the twenty-first anniversary meeting, will establish a new and glorious record for things accomplished in advancing the veterinary profession.

CLINICAL AND CASE REPORTS

REMOVAL OF THE NASAL SEPTUM

H. E. BEMIS, Ames, Iowa.

In the interest of new and better surgical methods, I should like to report upon a method of removing the nasal septum in the horse which has been used by us during the last two years with success in three clinical cases and several experimental cases. I should like to urge others to try it so that we may get reports upon a large number of cases in a shorter time.

The operation is as follows: Secure the animal upon an operating table, perform tracheotomy, and anaesthetize. Thoroughly shave and prepare the nasal region from the lower boundary of the frontal sinus downward. Trephine upon the median line at a point where the fingers begin to diverge from each other when passed from below upward over the nasal bones. This point marks the lower limit of the turbinal portion of the frontal sinus and will be found to be almost exactly at the same height as the posterior border of hard palate which is the best height at which to cut the nasal septum transversely. Be careful at this time to trephine the bone only, without wounding the mucous membrane and the accompanying submucous artery which if wounded results in disagreeable hemorrhage. Trephine a second time on the median line about 5 to 7 cm. below the first one and remove the plate of bone between the two. Pack the nostrils with gauze saturated with adrenalin chloride 1-3000 or paint the septum with the same. Inasmuch as the vessels of the septum are chiefly in the mucosa and submucosa they can be markedly constricted by a surface application of adrenalin and the hemorrhage greatly lessened during operation. It can also be greatly controlled by inserting a pair of long compression forceps through the mucous membrane at the upper border of the trephine opening and clamping the septum firmly just above the plane at which it is to be divided transversely.

With a sharp bistoury, cut the septum transversely as near its anterior extremity as possible. Place a narrow, long handled, guarded chisel astride the septum and push it along the roof of the nostril, cutting the septum from the nasal bones back to the level of the first trephine opening, or until the chisel comes in contact with the compression forceps. Withdraw the chisel and insert it

in the same manner along the floor of the nostril cutting the septum free from the vomer back to the posterior border of the palatine bone. With scissors or chisel inserted at the height of the trephine opening divide the septum transversely and remove it through the end of the nostril, either entire or further divided as may be necessary. Tightly pack the nasal cavity and release the animal.

Our best results with this operation were obtained upon a grey gelding weighing about 1700 pounds. He was brought in with a history of having received a blow upon the nose about one year previous which seemingly resulted in extensive thickening of the septum so that the animal was entirely useless for draft purposes without wearing a tube. The operation was performed as described above and the animal has been working now two years. He has from the first shown a little roughness in breathing when exercised but his usefulness is in no way impaired and there has been no tendency toward recurrence.

In the other cases the thickening of the septum was much less marked. We were able to follow these cases but a short time after operation but so far as they were followed there was no recurrence.

There are two steps in the operation which I consider to be very important. The first is liberal opening of the nasal cavity, so that the operator may work rapidly and accurately through the trephine opening, and the second is postponement of the greatest hemorrhage by reserving the transection of the septum for the last step. Great care must be taken to avoid injury to the superior turbinated bones. The use of a tampon canula instead of an ordinary tracheal tube greatly assists in preventing inhalation of blood during the operation.

I have made a search for literature upon this subject but have been unable to find any though I make no claim to having made an exhaustive study. I wish to acknowledge the use of specimens from the anatomy department and the value of the suggestions of Dr. H. S. Murphey regarding the operation.

ILLUSTRATIONS

1—View of head showing point A at which the fingers begin to separate from each other when passed upward over the nasal bones. (Specimen by Dr. H. S. Murphey and photo by F. E. Colburn).



FIG. 1.



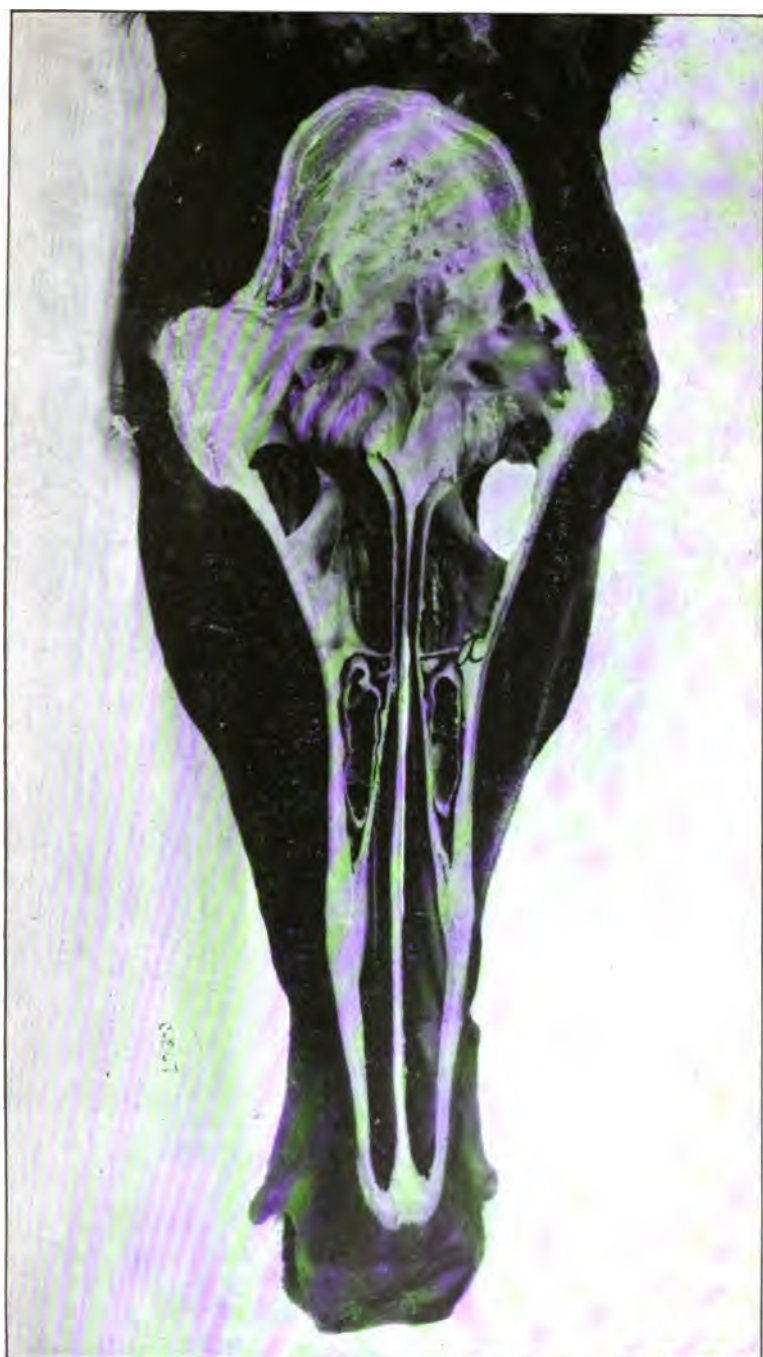


FIG. 2.



FIG. 3.

2—Frontal section removed showing point A to be at same height as point A¹ in Fig. No. 1, the height at which the septum should be divided transversely. (Specimen by Dr. H. S. Murphey. Photo by F. E. Colburn).

3—Frontal section of head of a horse showing a thickened and deflected septum. A¹ the height at which the trephine opening should be made. Note the small amount of space between the septum and turbinal bones at this point. (Specimen by Dr. H. S. Murphey. Photo by Colburn).

EVERSION OF THE RECTUM AND VAGINA IN A SOW

C. A. FAST, Haviland, Ohio.

The patient was a grade Chester White sow weighing 175-200 pounds with second litter of pigs. She was delivered of five healthy pigs but continued to labor and strain. The next morning I was called again to see her and found the mucosa of vagina and rectum everted, forming a mass as large as a human fist. The prolapsed mucosa was replaced, gauze packs inserted and a strong bandage applied across the perineum. The owner was instructed not to feed for a few days. Water was allowed. Three days later the owner reported the sow fully recovered and I advised him to turn her out with the rest of the hogs.

About ten days later estrum came on and with it a return of the eversion of the vagina and rectum. I decided to operate. The operation was as follows: After thoroughly irrigating the rectum and vagina I placed a home-made hollow wooden tube in the rectum, ligated and allowed the prolapsed markedly congested mucosa to protrude. The vaginal mucosa was disinfected, returned and the lips of the vulva stitched with deep suture, which included the fascia and skin of the perineum for an inch or inch and a half on each side.

In three days the protruded ligated mucosa of the rectum sloughed off and the wooden tube was passed. Later the stitches in the vulva were removed. The patient made a rapid recovery. At no time was there any increased temperature.

The five pigs died in 24 hours due to lack of nourishment.

The wooden tube was made out of an oak pitchfork handle.

It was about $1\frac{1}{2}$ " x $2\frac{1}{2}$ " with an opening through its center $1\frac{1}{4}$ " diameter for the passage of the feces.—*The Veterinary Alumni Quarterly, O. S. U.*

A CALF WITHOUT FRONT LEGS

E. P. JOHNSON, Raton, New Mex.

The accompanying photograph is of a calf born without front legs. At the time this picture was taken it was ten days old. I



will be noticed the anterior portion is off the ground; the calf trying to walk, (backwards). The spine of the scapula is on line with the long axis of its body; otherwise the calf is normal.

AN UNUSUAL OBSTETRICAL CASE

R. A. GREENWOOD, Painesville, Ohio.

This calf was delivered from a six year old grade Guernsey cow April 9th, having carried it 282 days, the photograph of which is just as it was delivered.

Upon my arrival at the farm which was about nine miles from my office, the entire bowels were presented, an examination revealed the bony parts of the pelvis and legs. The heart, as w

be seen in the plate, was outside the thoracic wall, although not beating, indications were that it was, prior to its being forced through the pelvic arch.



This distorted individual has the appearance of the posterior limbs being pulled back and over the body, and the spinal column left intact.

In the photograph the calf is lying on its left side.

INTUSSUSCEPTION IN THE HORSE

P. G. B.

A cart gelding, aged six, belonging to a market gardener. Horse of the heavy vanner type. Had done well since purchase; was a good worker, quiet and temperate in all harness. Had no illness prior to its last, and was in a very fair condition.

It was sent to town twice a week after a load of stable manure, it was the shaft horse, had a careful driver, and a man accustomed to horses.

On its return with its last load it showed slight abdominal pain on being let out of harness, thought to have colic; a draught was given. It got easier and was left for the night. Next morning it failed in its appetite, although it had eaten up its night feed. I then saw it for the first time; gave a dose of aperient medicine and left some fever mixture.

The condition of the animal's temperature 102, rather cold at the extremities, ears and legs; breathing rather short, no cough, no sweating, and not very restless; occasionally lay down. These symptoms continued for a few days. It walked very slowly when led out, and was stiff in the hind quarters; the flank drawn up with a wasting of the loins. It ceased feeding altogether, but would drink heartily.

After a day or two a fetid odor from the mouth, and a peculiar gurgling sound heard at the base of the neck in front, not like the sound of pericarditis. There was no "tinkling" sound.

My diagnosis: abscess in the abdominal cavity due to external injury. Prognosis unfavorable. Patient gradually wasted. It passed at times some loose feces. No violent purging. Micturition normal.

Marked feature of the case: the wasting, and the very slow movement in walking with a rambling gait.

Illness lasted about ten days. Owner sending in word now and then that he thought the horse was better.

The fetid odor from the mouth continued nearly the whole time, and towards the end was very offensive. Seeing recovery hopeless, had the animal destroyed. Post-mortem examination showed intussusception of the cecum within the large colon.

The whole of the cecum was drawn in, and between the walls

of the two bowels about a gallon of pus. The cecum was turned inside out, as it were, within the colon.

The injury was due, in my opinion, to a kick or blow on the abdominal walls received on the near side.

I have never previously seen anything like it. I have not seen a case recorded. How is a veterinary surgeon to diagnose a case of this kind? Recovery was impossible. Case may interest some of your readers.—*Veterinary News*.

—o—

PURPURA HEMORRHAGICA TREATED WITH NORMAL HORSE SERUM

LAWRENCE SCHLENKER, M.D., St. Louis, Mo.

This case of purpura hemorrhagica, in a man aged 28, is instructive in the showing of a prompt response to treatment with normal horse serum.

History.—The patient had measles during childhood. In his eighteenth year he suffered from an illness diagnosed as nephritis, from which he recovered in three weeks. While never robust, he had had no other diseases, and assurance is positive that he was never subject to abnormal bleeding of any kind. There was no knowledge of hemorrhage in any member of his family. The present illness began the middle of December, 1915, with symptoms diagnosed as grip. The temperature was from 103 to 104, and there were prostration, cough, and a mucopurulent expectoration. Under his physician's care he improved to some extent, when, January 9, he began to bring up large quantities of thin, bloody sputum. Two days later blood appeared in the urine, the latter soon taking on the appearance of pure blood. The following day purpuric spots occurred in the skin, and nasal hemorrhages took place frequently. It is stated that there was no vomiting of blood, no blood in the stools, and no aural hemorrhages. Exsanguination was now taking place so rapidly that the patient's condition was becoming alarming. * * * * *

Treatment and Results.—The patient was at once given 10 c.c. of normal horse serum, subcutaneously, which dose was repeated daily for the subsequent nine days, making 100 c.c. all told. With the exception of small doses of codein, given the first few days to quiet the nervous symptoms, no other medicine was administered.

There was no evidence of serum anaphylaxis at any time. Improvement in sputum, urine and in general condition was noticeable after the second injection of serum. Blood disappeared entirely from the urine after five injections had been given. The sputum became rapidly less in volume, as well as in the blood content. The moist rales in the lungs gradually became less evident.

January 29 there was neither cough nor sputum. The urine was normal in appearance, and negative to tests for albumin and sugar. Temperature was normal throughout the twenty-four hours. The pulse was stronger but still somewhat weak. Examination of the lungs showed entire absence of moist rales.

Strength, weight and color had improved greatly; the patient was up and about the institution. Except for some remaining weakness, which was steadily disappearing, he felt perfectly well.—*The Journal of the American Medical Association.*

TUBERCULAR MYOCARDITIS IN THE DOG

A. A. LEIBOLD, D.V.M.

Professor of Physiology; Assistant Professor of Pathology and Bacteriology
at The Chicago Veterinary College.

Tuberculosis is a common disease among some of our domestic animals, particularly cattle and swine. Fowls also suffer from this scourge to a far greater extent than is commonly believed. Dogs, cats, horses, mules and asses are not attacked by the *Bacterium tuberculosis* with the same frequency with which we find the first named animals attacked.

The *Bacterium tuberculosis* attacks lymph tissue and the parenchyma of some of the vital organs more frequently than other tissues of the body. The skeletal muscles of the body are rarely, if ever, tubercular but some cases of primary tuberculosis of the myocardium in man have been reported (2, 3, 4, 5). Herzog has had such a case brought before him (verbal communication). The fact that the myocardium is seen affected in this way in rare instances but the skeletal muscles seldom, if ever, may be the result of the peculiar high type of specialization of muscle tissue we find in the cardiac muscle.

Tubercular pericarditis is of more frequent occurrence than any other form of tuberculosis of the heart or its serous coverings (3, 5, 7), but in many cases it seems to follow pulmonary tubercu-

losis or generalized miliary tuberculosis (1, 3, 6, 7). However, primary independent tuberculosis of the pericardium occurs quite frequently in man (5) but tubercular myocarditis and endocarditis do not occur with nearly this same frequency (5) but follow mostly generalized miliary tuberculosis (3, 7). Tuberculosis of the valves of the heart seldom occurs except where the tubercular infection was preceded by a pyogenic infection of the valves which prepared the site for the tubercle bacillus (7). But a case of endocardial tuberculosis in a man is reported (8) which is claimed to have originated from primary infection with the tubercle bacillus. A noteworthy thing regarding this case is that the tubercles were found on the papillary muscles in the left ventricle and that at systole these tubercles came in contact with one another. The conjecture is that one tubercle derived its origin from the other through actual contact of the healthy papillary muscle with the tubercular. This case was observed in a man who died of more or less generalized miliary tuberculosis.

The upper or outer layers of the myocardium are not often involved as a consequence of tubercular pericarditis but we find endocardial and especially subendocardial tubercles fairly often in generalized miliary tuberculosis and in such conditions one can see individual or groups of miliary tubercles lying deep in the myocardium (7).

The infrequency of tuberculosis in dogs and especially tuberculosis of the heart or any of its coverings, and the inability of the writer to find a case of this kind in the dog after perusing voluminous literature, prompts him to report the following case brought to his attention:

The subject was a wire-haired, male, fox-terrier, born and registered in England, having been imported to the United States the latter part of June, 1914. He was a comparatively young animal. About three months after importation this dog was brought to the office of Dr. C. A. White, the owner complaining that the dog suffered from pneumonia. Before the dog was brought to Dr. White's hospital for treatment the owner said the dog showed dyspnea upon exercise but not the painful symptoms which caused him to suspect pneumonia. The dog was sick three days and then died.

Pathological lesions found upon postmortem examination were wanting except in the case of the heart and lungs. In the heart extensive grayish-white nodule formation had occurred which was

apparent both under the endocardium and pericardium. Upon incising the myocardium it was found that in some places the new-formed tissue had penetrated entirely through the muscle. The nodules had become confluent in some instances. The right half of the heart was considerably more affected than the left half and the walls of the auricles were more affected than the ventricles and in some instances were four times the normal thickness. The lungs were quite severely congested but did not show any other lesions.

Microscopic examination of the heart lesions showed inflammatory infiltration areas which were more or less definitely outlined but in some places the round cell infiltration extended between the fibres of the myocardium. Staining of such sections by the Ziehl-Neelsen method revealed a number of tubercle bacilli within the areas of round cell infiltration. Microscopic examination of sections of the lungs did not reveal anything more than a severe passive congestion. These microscopic diagnoses were confirmed by Dr. Maximilian Herzog.

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LITTLE DAMAGE TO THE ABBOTT LABORATORIES. A small fire with explosion of gases occurred April 21st on the top floor of one of the buildings of The Abbott Laboratories. Newspaper reports of the extent and character of this accident were grossly exaggerated. The damage was very small, consisting mainly of broken window panes and cracking of temporary partitions. The plant and machinery were injured but slightly, and the entire force was to work the next morning as usual. The Abbott Laboratories have issued a statement positively denying the newspaper reports that this firm is or has been engaged in the manufacture of ammunition or explosives.

ABSTRACTS FROM RECENT LITERATURE

NICOTINE POISONING. Arnold Spicer, F.R.C.V.S. *Veterinary Record*.—An army mare suffering with lice was clipped and dressed, as far as can be known, with a 1 to 20 solution of nicotine, instead of 1 to 120. An hour after the dressing was applied, she began to blow hard and show pain and broke out into a very profuse perspiration. Seen two hours after, she was still blowing hard and lying down. She was made to get up and walked staggering and trembling all over. She was taken to her box showing twitching of the neck muscles and jerking her head up and down. The extremities were cold, the pulse imperceptible and the temperature 93°F. There also appeared to be a form of lock-jaw, as the jaws could not be opened to permit the administration of a ball. Drenching was also very difficult. The mare gradually improved and was entirely recovered the next morning.

A. LIAUTARD.

PECULIAR BREED OF GOATS. J. J. Hooper. *Science*, Vol. 43, p. 571, 1916.—There is a peculiar breed of goats raised in central and eastern Tennessee. When suddenly frightened the hind legs become stiff and the animal jumps along until it recovers and trots off normally or if greatly frightened the front legs become stiff also, and the goat falls to the ground in a rigid condition. They have received the name of "stiff legged" or "sensitive" goats.

The farmers in Tennessee prefer them because they do not jump fences. They are snow white and look like ordinary goats. We are starting experiments (Kentucky State University) to determine whether this is a dominant or recessive character in comparison with a normal goat.

When this peculiar affliction first appeared I cannot say, but it seems to be possessed by all the goats in the section named.

BERG.

THE MODE OF INFECTION IN PULMONARY DISTOMIASIS. CERTAIN FRESH-WATER CRABS AS INTERMEDIATE HOSTS OF *Paragonimus westermanii*. Koan Nakagawa. *Jour. Infect. Dis.*, v. 18 (2), Feb., pp. 131-142, pls. 2-5.—Nakagawa, working in Formosa where pulmonary infestation with flukes was first discovered by Ringer in 1879, has found encysted fluke larvae in crabs and demonstrated by experimental feedings to dogs that these are the larvae of the

flukes in question. The larvae were found to be fairly common in crabs of the species *Potamon obtusipes* and *P. dehaanii* and were found to be rare, perhaps only accidental, in *Eriocheir japonicus*. The young encysted larvae were found in the liver of the crab; full-grown larvae were found on the gills. Larvae were sometimes found in the muscles. The larvae on the gills are visible as white specks to the naked eye. When removed from the gills, twenty per cent would float on the surface of the water and it is likely that infestation results from drinking the water so infested.

Puppies, brought from localities where there was no lung-fluke infestation in man, were fed these larvae. In 60 days the lungs had lungfluke cysts, but the eggs were not yet present; in 90 days eggs were present. A series of feeding experiments showed the following facts: Five days after feeding the larvae to a dog the lungs showed no macroscopic changes; in 7 days, fresh petechiae, no larger than a pinhead, were seen; in 14 or 15 days the surface of the lung showed hemorrhage, especially on lower lobes; from the twenty-first to the twenty-seventh day, small nodules appeared, besides hemorrhagic spots, the two usually associated; in 35 days hemorrhagic spots as large as flaxseeds; in 50 days the cysts of the fluke, as big as the end of the little finger, were present.

Postmortem examination of pups from 12 days to 4 weeks after feeding showed comparatively large amounts of serous exudate in the abdominal cavity; liver usually congested; diaphragm with numerous small perforations; many distomes attached to the surface of the liver and the great omentum; few petechiae, the size of a pinhead, on the spleen and the mucosa of the jejunum; hemorrhagic spots on the pleura; many hemorrhagic spots and small nodules in the lung. A microscopical section through a petechia in the jejunum showed that the young flukes penetrated the mucosa and muscularis and escaped through the serosa to the abdominal cavity. Similarly it was shown that they penetrated the diaphragm.

It appears from the foregoing that the young fluke, when ingested, penetrates the intestinal wall near the jejunum and attains the abdominal cavity; it then penetrates the diaphragm and attains the thoracic cavity; from here it makes its way into the lung. Some flukes make their way into the organs other than the lungs but do not attain mature development in such situations.

Nakagawa has also ascertained that the miracidia hatched from the eggs of the lung fluke will infest certain molluscs, *Melania*

libertina and *M. obliquegranosa*, and surmises that these forms may figure as intermediate hosts, but he has not demonstrated this point experimentally.

(It may be noted in passing that Ward and Hirsch (1915) have shown in a comparative study that the species of fluke described from the lungs of a tiger and known for a long time as *Paragonimus westermanii* is not identical with the lung fluke found in man by Ringer and described by Cobbold as *Paragonimus ringeri*, the latter name being, therefore, the correct one for the human lung fluke. The lung flukes reported from the United States from the hog, dog and cat constitute a third species, *P. kellicotti*, which is a form of some interest in meat inspection.) M. C. HALL.

PARALYSIS OF THE RECTUM AND BLADDER. Lieut. J. Fox, A.V.C. *Veterinary Record*.—Common light draught mare, aged 13, with no obtained history. She was said to be suffering from debility and paralysis of the rectum.

Her symptoms were: sphincter ani relaxed, quantity of feces protruding from the anus. There was incontinence of urine and the thighs were irritated by the imperfect and continuous dripping of the urine, which sometimes was expelled in drops or again in a stream. There was a partial paralysis of the tail, especially the levator muscles. Atrophy of the gluteals. No feces were passed. Vagina was normal. The rectum was dilated and 26 lbs. of fecal matter drawn away. Nothing abnormal in the pelvic cavity except great fullness of the bladder. Outwardly there seemed to be an appearance of enlarged sacral region which was probably due to the atrophy of the muscles. Physic ball and daily injections of strychnine proved useless. The animal was removed and lost sight of. A. LIAUTARD.

FLEXOR PEDIS PERFORATUS TENDON SLIPPING OFF THE OS CALCIS. R. Hudson, F.R.C.V.S. *Veterinary Record*.—This and the following were related at one of the meetings of the North Midland Veterinary Medical Association.

A posting mare when putting weight on one of her hind legs, was unable to hold the hock rigid and the quarter sank down. She became so bad that she was useless. The tendon of the perforatus was slipping outward until it was held by the tendon of the gastrocnemius. The owner decided to have the mare destroyed. Before

doing it, the operation of the division of the tendon between the hock and the fetlock followed by deep point firing on the side of the os calcis, where the tendon slipped over, was suggested and carried out. The mare was allowed seven or eight weeks' rest. When she was put to work, no slipping of the tendon could be seen, although the quarter still sank some. The mare pulled a bus for two or three years after and then was lost sight of. A. LIAUTARD.

FRACTURE OF THE JAW IN DOG. R. Hudson, F.R.C.V.S. *Veterinary Record*.—1st case. A racing whippet was run over by a motor car. Result, both jaws were fractured. Under the influence of morphia, the upper incisors were brought into position and bound with silver wire to the canines. The incisors of the lower jaw were secured in the same manner and then the two jaws were bound with broad tape and secured around the neck. This was left in place for 14 days. The dog was fed milk and soup, given with a spoon. Solid food was not allowed for two months.

2nd case. Large red retriever, of rather ugly disposition, had been run into by a tram. Result, a fracture of one side of the lower jaw. It was a clean fracture, about on a level with the premolars. Chloroform was administered. The divided ends of the bones were brought into position. "Two wire sutures were passed around the jaw, enveloping the ends of the fracture. The needle entered at the lower border of the jaw, passed alongside of the bone, was brought into the mouth, between the teeth, ending again on the opposite side, keeping close to the bone and out at the edge of the jaw where it first entered. The suture was then twisted up. A second suture was carried around the bone, enclosing the divided ends in a similar way, about half an inch below." The sutures being satisfactorily fixed, the jaws were bound with a tape. After a difficult after-treatment due to the ugly disposition of the dog, in relation to the keeping on of the bandage, of the muzzle, and of the mode of feeding, all of which took about four weeks, the dog made a good recovery. A. LIAUTARD.

CHEMICAL REACTION OF VAGINAL AND UTERINE SECRETIONS OF THE MARE AND ITS INFLUENCE IN COITUS. K. Hutschenreiter. *Wiener Tierärztliche Monatsschrift*, Vol. 11, pp. 449-483, 1915.—In the sexually sound mare, the vaginal mucous membrane is generally alkaline; the uterine mucous membrane is almost always strongly

alkaline, whether the mare is horsing or not. Excluding the exceptional cases, spermatozoa generally become motionless in the vagina of the sound, horsing mare inside of four hours after coitus, seldom after. Inside the uterus spermatozoa become motionless inside of ten hours, seldom after. Spermatozoa seem to retain their motility for a somewhat longer period in the vagina of the sexually sound mare that is not horsing. The destruction of the spermatozoa in the vagina and uterus of the sexually sound mare is caused by leucocytes and phagocytes. During phagocytosis in the vagina there is an increased secretion by the mucous membrane.

In the sexually sound, horsing mare, part of the sperm is ejaculated directly into the uterus during coitus: in the sound, sexually resting mare this does not take place because of the closed os uteri. Every vaginal irrigation may be regarded as a stimulus and favoring phagocytosis. Sodium bicarbonate tends to preserve the motility of the spermatozoa, physiological salt solution is indifferent. The value of irrigations lies in their creation of conditions favorable to ejaculation into the uterus, by the removal of the mucus from the vagina and the region of the os uteri. Irrigation also acts as a stimulus causing a partial opening of the os uteri. **BERG.**

PERSISTENT CONSTRICTION OF THE CERVIX UTERI IN THE COW APPROACHING PARTURITION. W. J. Paimans. *Archiv für wissenschaftliche und praktische Tierheilkunde*; Vol. 42, pp. 64-92, 1915. In cows and especially in heifers, persistent constriction of the cervix uteri occurs sometimes, when labor pains are apparently present. At this time there are no active, convulsive contractions of the cervix. The cervix without having undergone any pathological-anatomical alterations is normally rigid in the cow. In premature labor pains and in spasmodic closure of the cervix or its delayed opening, there are no normal, complete labor pains, there are no contractions of the uterus, only straining of the abdominal muscles. If the cause be removed, the straining disappears and with it the accompanying phenomena. The straining is caused solely by a part of the gravid uterus having found its way into the pelvic inlet either through an invagination of the vagina alone or along with part of the uterus and contents. The cervix lying close to the vulva or the incomplete prolapse of the vagina are in part the primary cause of straining and not its result. Treatment consists in repelling the part of the uterus into the pelvic cavity.

Care should be taken to prevent straining and prolapse by pinching the back of the animal and maintaining the hind quarters in high position. Pathological rigidity of the cervix through cicatricial contraction, or fibrous, scirrhus, scareomatous, carcinomatous changes, or by the formation of cartilaginous or calcareous deposits, is very rare in the cow. Aside from the usual Cesaerian section, favorable results can be obtained in pathological rigidity of the cervix only through vaginal hysterotomy, i. e., cutting into the cervix. Although numerous workers have performed this operation successfully, Paimans considers it very dangerous. BERG.

INTOXICATION WITH LIQUID TAR. Mr. Nieder. *Rec. de Med. Veter.*—A four year old mare had eaten tar used for mending roads. She refused all food, her nasal and buccal mucosa were covered with numerous superficial erosions. The urine was bloody. She exhibited all the symptoms of acute gastro-enteritis, complicated with nephritis and hemoglobinuria. Her conjunctival membranes were of a dirty yellowish color. The heart was weak, pulse hard and thready. There was great prostration. The urine was very dark, thick, without blood corpuscles, it contained 0.90% of albumin. Treatment—caffeine, camphor, sulfate of soda; gave no result and death took place after 48 hours of illness. Post-mortem revealed the classical lesions of hemorrhagic gastro-enteritis and acute hemorrhagic nephritis.

According to the writer, death was due to the oil of anthracite "carbol" compound of the liquid tar which has a characteristic odor readily detected in the mare during her life. A. LIAUTARD.

INTOXICATION BY CALOMEL. Mr. Nieder. *Rec. de Med. Veter.* Ten year old draught horse was subject to intermittent, dull colics. He had received in three days 16 grams of calomel. Half of it one day, the balance three days after. On the 5th day he passed bloody urine, and was considered as suffering with acute hemorrhagic nephritis. Three days after, the general condition improved and to the hematuria succeeded a severe polyuria due to the diuretic action of the calomel. After fifteen days all the bad symptoms passed away and recovery was complete.

According to the writer, this case showed that 8 grams is the only dose of calomel that can be given as a maximum, and which ought not to be renewed without running a risk of an intoxication that might prove fatal. A. LIAUTARD.

HORSES INJURED BY BEE STINGS. A. Mayer. *Münchener Tierärztliche Wochenschrift*; Vol. 66, p. 856, 1915.—Two horses in harness were passing a bee hive when one of the horses fell. Both were soon covered with bees which had been rendered irritable by a long period of bad weather. The bees were especially numerous on the head and ears. The horses were soon in need of veterinary aid.

They were rubbed with dilute ammonia water, then washed with 2% lead acetate solution, and given morphine injection. Great difficulty in breathing during the next few days on account of the swollen wings of the nostrils. For several days they could not pick up feed on account of the inflamed swollen lips. The resulting weakness and threatened collapse were treated with alcohol while the external treatment with lead acetate washing was continued.

After a week the horses showed the following interesting picture: At numerous places on the body, there were nodules as large as beans or almonds. On pressure, a thick yellowish pus came out. These abscesses became confluent, and threatened an extensive necrosis of the skin; that of the ears seemed unavoidable. However, after a careful and persistent expression of the pus, treatment of the wounds with Burow's solution (aluminum acetate) and dusting the wounded surfaces with iodoformtannin, the horses were out of danger in three weeks.

BERG.

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SULPHURET OF CARBON AGAINST GASTROPHILUS EQUI. Mr. Nieder. *Rec. de Med. Vet.*—Three horses were brought for consultation because of dullness and unwillingness to work. They were in a satisfactory general condition and all had around the edge of the anus, larvae of oestri. On one only, the examination of the blood showed a well marked characteristic eosinophily, which was considered as due to the presence of animal parasites.

The three horses received, first a purgation with a bolus of 20 grams of extract of aloes. The next day, on an empty stomach they received successively four capsules of 10 grams of sulfuret of carbon, given at one hour intervals. The success was complete. The following day, numerous dead larvae were thrown out and none of the horses manifested any of the symptoms of intoxication as mentioned by some as accompanying the administration of sulphuret of carbon.

A. LIAUTARD.

EVERSION OF THE RECTUM—EXCISION. R. Hudson, F.R.C.V.S. *Veter. Record.*—A yearling Shire colt was found in the field with bowel protruding. The condition existed for some days, as the organ was tumefied and lacerated. The prolapsus measured eight inches. After antiseptic care, it was smeared with lard and with little difficulty returned in place. Although the anus was packed with cloths, and the tail tied tightly, the trouble returned and the next day an operation was decided upon and performed. "After casting, anesthetizing, emptying rectum, washing with carbolic solution, a tape suture was passed through the skin and bowel in the upward direction, then out from side to side to hold the bowel from slipping into the rectum after removal of the protruding portion. An incision was carried around, and as it came to the tape sutures, they were tied and the ends left on to pull at, while numerous interrupted sutures of strong silk were inserted through the mucous membrane, subcutaneous tissue and the skin of the anus." Soft bran mash and gruel to drink was the diet prescribed. Attention to the rectum was necessary until the animal passed his feces by himself and without straining. It took several weeks before a normal condition existed.

A. LIAUTARD.

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THREE YEAR OLD COLT HAD NAVICULAR DISEASE. Henry Taylor, F.R.C.V.S. *Veter. Record.*—The colt was the issue of a sound sire and dam. While being broken to harness, he became suddenly lame. The seat of lameness was located in the region of the coronet. He was blistered and became almost sound in about two months. After a while the lameness returned and the colt began to point. He was unnerved. Was able to work for one year until he became lame again. The ends of the divided nerve in growing together again were sensitive to the prick of a pin. A small neuroma had appeared, the feet became smaller and contracted, the colt was unnerved again and after some time became practically sound and useful.

A. LIAUTARD.

The next meeting of the Missouri Valley Veterinary Association will be held at Omaha, Neb., July 10, 11 and 12.

Dr. F. C. Hershberger, who has been at Blagovestscheusk-on-Amur in Siberia, has left for Pa-hei-ho, North Manchuria, China, to be stationed at the government hospital.

PROCEEDINGS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

(Continued from page 292)

PRESIDENT MARSHALL: If that is the understanding of the association I think you are prepared to vote. It is an amendment. All those in favor of accepting the report of the executive committee to amend the by-laws so as to conform with the requirements of the civil service examination, make it manifest by saying "aye"; opposed "no". The "ayes" have it. It is so ordered.

DR. MAYO: Also at the meeting this morning (the notes have not been written up) the executive committee recommends that the history and civil government of Canada and Great Britain be substituted in this amendment for all colleges in Canada, in the place of United States history and civil government, for all graduates of Canadian schools.

DR. KINSLEY: I move that the recommendation be accepted.

DR. HOSKINS: I second the motion.

PRESIDENT MARSHALL: The motion has been made and seconded that Canadian and English civil government and history be substituted for the graduates of Canadian colleges, in place of the requirements of United States History for our own colleges. All those in favor of the motion—— —

DR. MAYO: This an amendment to the constitution.

DR. STANGE: Mr. President, I rise to a point of order. Is it necessary to vote on it at this time? My understanding is that the association does not vote on it until a year from now.

DR. MAYO: The Doctor is wrong. This is a report of the executive committee. These are amendments proposed by the executive committee and we accept the recommendation and the matter will be laid over until next year, when they will be voted upon as amendments to the constitution.

PRESIDENT MARSHALL: The question is called for. Those in favor of the question make it manifest by saying "aye". Opposed "no". The "ayes" have it. It is so ordered.

If there is no objection we will give the secretary a little more time to get his further report in shape, and during that time, we can hear Dr. Campbell, if he is prepared to report, as chairman of the Committee on Necrology. If there are no objections Dr. Campbell will give his report.

DR. CAMPBELL: There has not been an opportunity to consult with the other members of the committee on necrology since I got here this morning, so that if they have additional material to add it will be, as has been the custom, furnished later for the information of the publication committee.

The report of the committee on necrology is as follows:

REPORT OF THE COMMITTEE ON NECROLOGY

D. M. CAMPBELL, Chairman.

It is the painful duty of your committee on necrology to report the loss, by death, of a greater number of members during the

period intervening since our last meeting than the association has ever before suffered in a like period of time. The Grim Reaper has garnered his victims from every line of veterinary endeavor, sparing not because of present usefulness, past accomplishment, or future promise, but has called to the Great Beyond those whose record of service to this association, to their immediate localities and to humanity in general, we shall ever cherish as a cheering memory and pass on as a heritage to those who follow us and to the whole profession of veterinary medicine; He has likewise with impartiality compelled us to mourn members taken from our midst at the very threshold of their greatest usefulness, leaving us to contemplate with bitterness the bright hopes and great promise blasted by their untimely deaths.

To the bereaved families and near friends of these deceased and to their larger communities, this association extends its sincere sympathy in their loss, which is its own as well.

John Buford Archer, D.V.M. Residence, Spencer, Indiana. Graduated from the Indiana Veterinary College 1901. Died June 12, 1914.

Francis Bridge. Residence, Philadelphia, Pa. Born in 1835. Died at his home March 26, 1914 of a complication of diseases.

H. T. Doak, D.V.S. Residence, Bisbee, Arizona. Graduated from the Kansas City Veterinary College 1905.

Wm. A. Dryden, V.S. Residence, Columbus, Indiana. Graduate of the Ontario Veterinary College 1892. Died at Oxbridge, Ontario, 1911.

T. B. Hillock, V.S. Residence, Columbus, Ohio. Graduate of the Ontario Veterinary College 1872. Died March 4, 1914.

Edward L. Kalb, V.S. Residence, Rochester, Minnesota. Graduate of the Ontario Veterinary College 1893. Died at his home August 2, 1914.

Paul C. Koto, M.D.C. Residence, Forest City, Iowa. Graduate of the Chicago Veterinary College 1895 and attached to the office of the state veterinarian for 18 years, 9 years an assistant, and 9 years as a state veterinarian. Died at his home January 19, 1915.

Milton F. Leffingwell, D.V.S. Residence, Austin, Minnesota. Graduate of the Chicago Veterinary College 1892. Died December 15, 1913.

James A. McCloskey, V.M.D. Residence, Philadelphia, Pa. Graduated from the University of Pennsylvania 1908. Mail returned marked "Dead" in 1914.

Walter McHenry, V.M.D. Residence, Marion Center, Pa. Graduated from the University of Pennsylvania 1908. Died at his home August 6, 1913.

David McKibbenger, V.M.D. Residence, Philadelphia, Pa. Graduated 1906 Ch. of Philadelphia, M. I. Federal service. Died of Bright's disease, August —, 1915.

W. H. McKinney, D.V.S. Residence, Kansas City. Graduated from the Chicago Veterinary College —. Died at his home February 23, 1914.

Edward Woodyear Mumma, V.M.D. Residence, Lexington, Ky. Graduated from the University of Pennsylvania 1912. Died at his home December 4, 1914.

John W. Nicholson, M.D.V. Residence, Chicago, Ill. Graduated from the McKillip Veterinary College 1909. Mail sent to his address June 4, 1914 was returned marked "Deceased."

Chas. B. Parker, M.D.C. Residence, Monticello, Minnesota. Graduated from the Chicago Veterinary College 1906. Mail returned marked "Deceased" 1914.

Don W. Patton, D.V.M. Residence, Steele, North Dakota. Graduated from the Iowa State College 1893. Died May 27, 1914.

Henry D. Paxson, V.M.D. Residence, Chicago. Graduated from the University of Pennsylvania 1893. For a number of years engaged in the federal meat inspection service and was a member of the faculty of the McKillip Veterinary College. Died ((about) June 28, 1915.

Wyatt E. Ralston, D.V.M. Residence, Pullman, Washington. Graduate of the Ohio State University 1904. Died December 18, 1913.

Francis T. Richardson, D.V.M. Residence, Fallon, Nevada. Graduate of the Washington State College 1907. Died of anthrax August, 1914.

Daniel Elmer Salmon, D.V.M. Residence, Butte, Montana. Graduate of the Veterinary Department at Cornell University. Organizer and for 25 years Chief of the United States Bureau of Animal Industry. President of this Association 1897-98. Died August 30, 1914. See report of Salmon Memorial Committee, October, 1915, p. 101, by Dr. W. Horace Hoskins.

Anthony Small, D.V.S. Residence, Hayward, Calif. Graduate of the San Francisco Veterinary College 1910. Mail returned 1915 marked "Deceased."

Henry S. Smith, V.S. Residence, Albion, Michigan. Graduate from the Ontario Veterinary College 1889. Mail returned in 1914 marked "Dead."

B. A. Sugden, V.S. Residence, Montreal, Canada. Graduated from the McGill University 1897. Died July 30, 1915.

George M. Walrod, V.S. Residence, Stormlake, Iowa. Graduated from the Ontario Veterinary College 1894. Died of apoplexy September, 1914.

DR. MAYO: Mr. President, in explanation of the blunder which appeared in regard to one of our members who was reported deceased when he was not, I will state that I used every available means possible to keep track of the members, but when mail comes back marked "Dead", I assume the man to whom it was sent is dead. That is the way it occurred. Naturally I took out the man's card and put on it the information I had, which was sent to the committee on necrology. That is how the mistake occurred.

DR. KINSLEY: I move that the report of the committee on necrology be accepted. Seconded by Dr. Hoskins.

PRESIDENT MARSHALL: It has been moved and seconded that the report of the committee on necrology be accepted. All those in favor of the motion signify it by saying "aye"; those opposed "no". Carried. It is so ordered.

DR. SHEPARD: As chairman pro tem of the committee on resolutions I would like all resolutions handed in before two o'clock this afternoon.

PRESIDENT MARSHALL: I believe that completes the program of the morning. There is a part of the executive committee report which has not been finished which we will take up this evening. It is unfortunate that that may have to be referred back for we will not have another session after that.

DR. STANGE: I wish to call your attention to the nominating committee which was to be appointed.

DR. McKENNA: I move that the president be given until two o'clock to report the personnel of this nominating committee.

PRESIDENT MARSHALL: That will be a section; not a general meeting of the association.

DR. V. A. MOORE: The nominating committee would have to have time to report back to the association. Of course if the committee could report at a meeting to-morrow, or if there is a meeting of the general session at noon or this evening, you could appoint it privately.

PRESIDENT MARSHALL: I might make it a special order of business and appoint the committee as soon as we are through the symposium on shipping fever.

DR. STEWART: I move that we adjourn, to meet immediately following the close of the special section, the symposium on influenza, to transact unfinished business.

PRESIDENT MARSHALL: To finish all the business except the election.

DR. KINSLEY: I second that motion.

PRESIDENT MARSHALL: You have heard the motion and it has been seconded. Any remarks? Those of you in favor of adjourning to meet immediately following the symposium on influenza which is scheduled to take place in this room at two o'clock, signify by saying "aye"; opposed "no". The "ayes" have it. It is so ordered. We are adjourned.

Oakland, California, Sept. 2, 1915.

The sixth business session of the fifty-second stated meeting of the American Veterinary Medical Association was called to order by the President, Clarence J. Marshall, in accordance with the former adjournment, immediately after the symposium on shipping fever.

PRESIDENT MARSHALL: Gentlemen, the general session of the American Veterinary Medical Association is now open. The first order of business is a report from the executive committee. The secretary tells me he is not quite ready to report yet, but there are two or three other matters to come before the session. The first is the report of the committee on history.

Mr. Hicks of the Exposition Committee is here and would like to make an announcement before we proceed.

MR. HICKS: I would like to call your attention to the program for tomorrow morning. As you will see, to-morrow is American Veterinary Medical Association Day at the Panama-Pacific Exposition. The program for the morning is pretty well outlined, and all I want to say is that we will have to start early in the morning in order to carry it out on time. We will have to be on the cars in front of the hotel at 8:30 for they will leave at 8:34, so that we will be able to catch the nine o'clock boat going to the exposition, arriving there at 9:30. There we will be sure to meet you and show you onto the train. The party will take one of those miniature trains up to the Livestock Building, the Hall of Congresses. We have arranged to have a photographer there who will take your pictures. Then we will have our exercises,—the installation of officers. We will be there until a few minutes before eleven. The next trip will be to the Presidio where the cavalry will give us a special drill upon the parade ground, and it will take us a few minutes to go up there. They will begin the drill at eleven o'clock. It will be very interesting and we all ought to see it. The only thing I wish to add is that it will facilitate our work considerably if each member and each lady who accompanies the party will wear the little blue cross conspicuously.

PRESIDENT MARSHALL: Dr. Murphey will make the report for the Historical Committee.

DR. MURPHEY: Gentlemen, I wish to read some extracts from the paper of the chairman of this committee, Dr. D. Arthur Hughes of Chicago who is unable to be present but requested me to read in his place.

Dr. Murphey then read portions of Dr. Hughes's paper which is as follows:

REPORT OF THE COMMITTEE ON VETERINARY HISTORY

D. ARTHUR HUGHES, Chairman

H. S. MURPHEY

W. L. WILLIAMS

TAIT BUTLER

F. H. OSGOOD

Mr. President and Gentlemen of the Association: At the fiftieth anniversary convention of this association, held in the city of New York, there was a strong feeling among the members, that, as the association was at that time celebrating the completion of a half a century of work, so something should be done to trace in writing the half century of progress made by the veterinary profession in America. President Mohler, in the oratorical close of his address, expressed the feeling which was tingling in the association when he eulogized the early leaders and paid tribute to their amazing industry, versatility and keenness of intellect; their unfaltering cultivation of the field of veterinary science; their devotion and the beneficial results of the time and abundant knowledge they gave to the service of the public and the profession. But he expressed the thought in everyone's mind in his memorable words: "From the history of veterinary medicine let veterinarians draw confidence in the invincible strength of their science; which, though at one time despised even by the well-informed, has during the last five decades attained such great importance and such wide influence in the life of this and other countries. And let them take fresh courage and make new resolutions to rival all the other professions in the useful work to be accomplished in the fifty years to come."

The consequence of the existence of the feeling that something should be done to put in writing the record of the profession for the five decades, mentioned by Dr. Mohler, was the passage of a motion calling for the appointment of a committee: "to provide for an outline of the history of veterinary progress in this country during the last fifty years". And that, "the complete report be kept in the archives of the society and that a summary of these reports be furnished at the next annual meeting by the committee and published in the next annual report".

The Work Attempted by the Committee. The writing of the history of a profession like ours, and covering fifty years of its progress, or treating it summarily or in outline, is a large task. Such a narrative, in which is related the many varied forms of progress that has been made in the half century, will, we must confess at

the outset of this report, take more than one year, probably several years. There never was a piece of historical writing, laden with knowledge, which took much time to accumulate, which did not consume years to write. Macaulay's History of England is a famous example, though it refers to a common experience, which covers only fifteen years of British history, and consists of five volumes; yet it took the gigantic intellect of Macaulay eight years to write the history. Time and much study are necessary if an excellent piece of historical writing is to be finished.

The committee, comprehending the desire of the association when it was appointed, and desiring to perform its work satisfactorily, devoted its attention to the preparatory steps for its work, attempting to make a survey of the field of American veterinary history for the last fifty years; to look up the historical materials or the sources of information which should be studied; to consider the difficulties to be overcome before the work could be gotten well under way. This preparatory study was the work of the chairman of the committee. Our colleague, Dr. Howard S. Murphey, gave his time to a study of certain phases of the local veterinary history of Ohio and Iowa.

Veterinary History—National and Local. There is a wide difference between national American veterinary history and local veterinary history. Local veterinary history concerns itself with what has been done, in any given period of time, in a particular section of the country—a state, province, county or city. Local veterinary history represents one part or section of national veterinary history. Consequently, the more local veterinary history is studied and written upon, the larger accumulation there is of local veterinary histories, the better can the national veterinary history be written. The duty of the history committee of this association is to write a history of veterinary progress for the last fifty years. The call here was for an historical narrative of the progress of the whole profession in its national signification.

The Problem of the writing of American Veterinary History for Fifty Years. The magnitude of the study of American veterinary history for the last fifty years is seen when one surveys the ground to be covered in such a piece of work, and comprehends the size of the task. The history of the five decades of progress called for should consist of many chapters or sections. There should be, first of all, a consideration of the whole question of the development

of veterinary education. A volume could be written on that alone—and a very large volume, too. Even an outline should cover the beginnings of veterinary education; the history of the veterinary colleges; the spread of veterinary knowledge; the attempts at standardization of veterinary education; the extension of veterinary educational methods abroad to the Philippines, and, through training of foreign students, to other countries. There should be a chapter or more on the history of the Bureau of Animal Industry from its origin in 1884 to the present. This also means the writing of a very large chapter, or more likely many chapters, in veterinary progress. One of these should be an account of the development of the work for the control of animal diseases through federal auspices, together with the facts of the cooperation of the states; and another should be on the development of meat inspection interstate and foreign. Veterinary legal development during fifty years would be another chapter, treating of food laws and veterinary history and the extension of federal food examination methods in the several states; federal and state drug laws, including such measures as the Harrison anti-narcotic law; the federal biologics law and the states. There should be a chapter on the development of veterinary practice laws, including a study of the work of examining boards. Our humane laws in their relation to the profession should not be neglected. The history of veterinary progress should also have much to say about the development of veterinary medical and surgical practice, comparing the beginnings of practical work with the scientific work done at present. Part of the history should concern itself with the struggle of the profession for recognition on a par with other professions and of the efforts for the recognition of the profession in the United States army. Nor should a study of the development of American veterinary literature be overlooked; of the development of pamphlet writing; of the improvements in textbook writing and general veterinary scientific publications. A chapter on the development of veterinary journalism would bring out many surprising facts; for, though we have not gone so far forward in this respect as the Europeans, we are making progress in this direction. Also a part of the study of American veterinary history should be given to the development of veterinary organizations, national and state, and of their influence in the making of veterinary progress. Considerable portions of any such history of veterinary progress would be given up to the making

of American veterinary history; to movements for the good of the veterinary profession and how they were started; to concrete references to important changes brought about by individuals.

Such, broadly, are some of the phases of American veterinary history during the fifty years. A survey of the field shows its large area.

The Materials of American Veterinary History—or the Sources of Information. To write intelligently this part of American veterinary history, one must know the materials on which it is based, or be acquainted with the sources of information.

There are, in this case, three groups of materials—the national, state and individualistic.

Amongst the national materials, upon which one must draw for the narration, are, first, the United States Veterinary Association papers and The American Veterinary Medical Association annual reports. There are not a great many people who have a full collection of these. They are found mostly in private libraries at widely separated points. The great public libraries, like the Chicago and New York libraries, and the great medical libraries, like the Crerar library or Senn collection in Chicago, do not contain them in full sets. Another source of information, national in character, is the Bureau of Animal Industry annual reports, and, indeed, the whole collection of Bureau of Animal Industry publications. The chairman of your committee has a complete set of the Bureau of Animal Industry annual reports from 1885 until the government ceased their publication two years ago, and he has a large collection of Bureau of Animal Industry papers from 1903 onwards. But there is hardly anyone who has a complete collection and it is probably not to be found outside of Washington. Still another source of information would be the collected papers of the various secretaries of the United States Veterinary Medical Association and the American Veterinary Medical Association—not the sparse reports found in the annual reports; but the complete correspondence of all these secretaries which belong to our archives. These, if they are now to be procured, would throw floods of light on many questions of this progressing association during fifty years. Perhaps these files cannot now all be obtained, but as many as possible should be. The profession has met in annual convention in many cities and our object has been to stimulate interest in the profession at these points. Therefore newspaper accounts of places

where the association has met will give the local color and effect and editorials or other comment will indicate influences. Photographs and other notes are of historic value as an indication of tendencies. In writing of the literary progress of the profession a study must be made of publications in book form printed from year to year during the fifty years. In the beginning we had no books. Now we have many. What library is there that has a complete collection of veterinary books published in English in America during the half century? Such a collection would be of very great veterinary historic interest, indicating what progress has been made with the lapse of time. Similarly a complete collection of veterinary surgical instruments, used in America from year to year, or decade to decade during the period, has much historic value and would furnish the historian much information of national veterinary interest. The progress of veterinary surgery in America would be best learned from a study of them and the uses to which they were put. Of further national veterinary interest would be the study historically of a collection of drugs and appliances used from time to time during the fifty years. Development can be traced by studying the medical materials employed by empirics and their uses and comparing them with later medicines. The writer of national veterinary history, in order to know of the development of veterinary law, must consult a collection of such laws and regulations from the beginning of the fifty years. Step by step he must trace the development of veterinary law in enactments and the changes made in them. To write accurately he must avail himself of a complete collection of such laws. The development of veterinary journalism can only be safely traced from consulting a collection of sets of veterinary magazines and periodicals, both those now existing and those defunct. Fairness requires that humble or unpretentious publications as well as ambitious ones be studied. Even such privately printed periodicals, like drug house publications or college publications, must be considered; for all, whatever their immediate use to their owners may happen to be, have their effect on veterinary progress.

In the writing of fifty years of veterinary progress, state sources of information must be investigated. This is illustrated in Dr. H. S. Murphey's report which follows: For instance the study of the laws and regulations in every state which have to do with control work, especially the progress made in each

state in this line of work from time to time, the new laws and regulations which came into being, will help materially in writing the account of veterinary development in control work. Reference must also be made to the veterinary practice laws and regulations of each state, improved as they are on occasion by veterinary influence, if the writer is to treat this subject understandingly. The part veterinary examining boards have played in veterinary development can only be known by comparing them all and their influences and knowing the facts on the spread of veterinary intelligence through their work. Where is there a complete collection of all the practice laws with all emendations and the changes in regulations from the beginning of the fifty years? Yet a proper account of veterinary development in this line cannot be written until such a collection, or as much of such a collection as can be secured, is read and used in the work of writing. The veterinary colleges, particularly the state veterinary colleges, have published many papers of many sorts, referring to themselves and their work. Copies of all of these that are available should be secured as necessary material for chapters on the development of veterinary education in fifty years.

There are other sources of information on veterinary progress which must be had from individuals, or if the information wanted cannot be obtained at all, the narrative would suffer unless such information as is obtainable has been taken into account. Many veterinarians who have had much to do with veterinary progress have been great letter writers. In some instances men with epistolary gifts have done some of their most effective work through their letters. Collections of letters are often very valuable sources of information and they will prove so to the man who writes veterinary progress. Private journals and scrap books frequently shed light for the historian and we doubt not there are in existence such mines of information which belonged to veterinarians who helped in the making of veterinary progress. If so, these sources of information should be consulted. It is within the family circle that a man is best known. Some men are inveterate collectors. The family treasures of celebrated veterinarians will often contain notes and other manuscripts or collections of private papers of value as veterinary historical material. Families of veterinarians should not consign them to junk dealers or permit them to become mouse-eaten in garrets; but should turn them over to

veterinary libraries for preservation and use by the historian of veterinary progress. Published or unpublished speeches of veterinarians, with notes on the occasion of them and their effect, are of use historically, as are press notices, pictures and necrological notes and privately printed papers.

These—national, state and individualistic materials—are the sources of information for the writer on a half century of veterinary progress. The materials are vast in amount and not always easily accessible. Yet there would hardly be those who would have the temerity to deny that the many chapters of veterinary progress cannot be adequately written until such sources of information are drawn upon, and until each has rendered its quota of information on veterinary progress during the period to be studied. Investigation of them is the business of the historian: for historical research requires even more patience than scientific research.

Difficulties of the Committee Preparatory to Meeting Its Obligations under the Terms of Its Appointment and Suggestions for Improvements. The fact must be patent to everyone that the committee on veterinary history, asked, as it was, to write an account of veterinary progress during the first half century of professional life on this continent, would have difficulties. At present the necessary historical materials are incomplete, scattered, inaccessible to the historical worker. The sense of the importance of its historical materials has not been aroused in the profession. The profession knows that it is making progress; but very few persons know how great the progress is. The reason for this is that no short history of veterinary progress has ever been written. Nor can it be until the sources of information can be reached. The inaccessibility of data is due to the fact that no provision has been made for assembling it in accredited archives. We have had, up to this hour, no official depositories for national veterinary archives designated by us officially. What is needed is that we should decide upon a place for deposit of national veterinary archives and secure a place for their safe keeping and orderly arrangement. When such a place is decided upon, and officially sanctioned, those in office should be held responsible for the forwarding of documents and other materials of historical value to the official depository. In time, when it becomes known that we have a place for veterinary archives of national significance to us professionally, members of the profession will get the habit of sending books, pamphlets, manuscripts and substances to the officially designated depository.

It is of the highest importance that our national veterinary depository should be in Washington in a department of the Government in which the profession does much work. The library of the Surgeon-General of the Army at Washington is the greatest medical depository on the continent. If we are not mistaken its collections are in the Smithsonian Institution. The veterinary profession might find a similar depository; but it would be preferable to designate the library of the Bureau of Animal Industry as our official depository. An arrangement should be made with either the Smithsonian Institution or the Bureau of Animal Industry to take care of our archives. However fast they might accumulate they would in either place be well taken care of. When this was done cooperation could be brought about between the persons in charge of the veterinary depository, and the numerous producers of veterinary literature and substances, to enrich the archival deposit and make it useful to the veterinary profession.

In the same manner the profession should have an official depository in each state to which copies of veterinary publications of all sorts and manuscripts could be sent, arranged, systematized, and made accessible for the use of the profession. It is difficult to keep such records as things are now. Valuable records are easily lost, go out of print and may become unobtainable. The state association proceedings are apt not to be published and the records are therefore lost. State historical association papers and state historical documents of all kinds are usually published by the commonwealths at the state printer's office. Many veterinary publications in the states are state official documents and to ensure the keeping of a complete file of state veterinary documents it would be a short step to officially designate some state veterinary official as state veterinary archivist. The work of receiving, arranging and classifying could be done through either the state veterinarian's office or the office of the veterinarian of the state experiment station. The state veterinarian's office is usually in the capitol and the state librarian is near at hand. The state veterinary organization should be able to make this the agency for preservation of state veterinary archives, both those which are official state documents as well as those produced by its own organization and by veterinary schools or other sources of veterinary information.

Historical Museum of Veterinary Medicines and Surgical Instruments. While the chairman of the committee on veterinary

history was visiting the Smithsonian Institution, Washington, D. C., which is the national museum of the United States, and was seeing the magnificent scientific collections some time ago, he spent half a day examining the cases containing specimens of medicines, surgical instruments and appliances which have been used in the practice of human medicine in various epochs of this country's medical history. They are arranged for historic purposes, showing the development from barbaric methods and fake methods to modern medicine and surgery. They display the stupidity of quackery; the resorts to charms and myths of medicine at times for restorative purposes instead of scientific knowledge; the ignorance of medical practice when anatomy was not studied and no man dared to open a cadaver. The collection is still to be seen in the Smithsonian Institution, and it suggests the thought that the veterinary profession in America could hardly do better than to furnish such a collection to the Smithsonian museum to prove to the public visually the developments in veterinary medical and surgical practice. The public would learn much and the historian of veterinary progress would learn more. If these specimens are pictured, with annotations, in the history of the last fifty years, how illuminating the chapter would be.

The Feasibility of Writing a Short History of Veterinary Developments During the Last Fifty Years. An outline of veterinary developments for the period mentioned can be written and will be written when preparations are completed for accurate work. Slapdash work on such a subject won't do at all. Here fiction, legends and inaccuracies are unpardonable sins. The outline should cover the period suggested already in the report; but fully enough so as to do justice to the many forms of veterinary development, slighting none and overdoing none. The outline should be partly chronological and partly not. A great deal of the development has taken place during the last fifteen years and much of this does not call for chronological arrangement except to give dates when developments occurred. The sections may be made larger or smaller according to the weightiness of the data. It would be possible within the space of one hundred pages octavo to write in book form—chaptered and indexed—an acceptable short history of veterinary development. Such a work, it seems to us, should appear separately as a supplement to the annual report of the association of the year, a copy being furnished to each member when it is ready. This

something that is not uncommonly done by learned bodies. It might be possible to get the Carnegie Foundation for the Advancement and Endowment of Education to print it or the Smithsonian Institution. The latter, for years, published free of cost the annual reports of the American Historical Association. We cannot tell the length of time it would take to prepare the book: for that depends upon ability to gather data and to write accurately.

Profit of the Writing of a Narrative of American Veterinary Development to the Profession. All the arguments which apply to the teaching of the history of the United States in our schools and colleges apply to the reading of American veterinary history by American veterinarians. It is good to teach American history in the schools because young Americans learn the grand accomplishments of the American people in the past and emulate those who have gone before them. The reading of American veterinary history by the student or those in practical professional life will raise their spirits through the power of noble example. The profession of the present and the profession of the future would profit by reading such a narration. Men who do not read history know nothing of their progenitors. Men who, veterinarians though they may be, know nothing of veterinary history have not that constant manly pride in their profession begotten of an ever-present knowledge of its past accomplishments.

Recommendations of the Chairman of the Committee on Veterinary History. In view of all that has been said the chairman of your committee recommends:

1. That the committee be continued for further study of the history of veterinary advancement, to report its progress as the work proceeds and at length when it is completed.
2. That steps be taken to turn to practical account the suggestions made in the report regarding a national depository for veterinary archives and the formation of a veterinary section in the medical museum in the Smithsonian Institution in Washington.
3. That the office of historiographer and veterinary archivist be established by the association, whose duties shall be: to take care of the association's archives and see that the national veterinary depository, previously mentioned, is furnished from year to year with documents or manuscripts valuable as material for the study of national veterinary progress; to write reports of national veterinary progress; and for other purposes of a similar nature.

4. That Dr. H. S. Murphey's report be accepted and turned over to the officer in charge of publications, with the recommendation that the *type-written matter therein be printed* with the customary lists of authorities from which the knowledge was drawn; that the documents attached to his report be kept in the archives of the association; but that Dr. Murphey be given permission to republish his report locally in Ohio and Iowa.

All of which is respectfully submitted.

D. ARTHUR HUGHES, Chairman.

DR. MURPHEY: I wish to say, that we went to no little trouble to collect the local data and this material, and so far as the usefulness of the committee is concerned, we feel that it is at an end, but on account of the recommendations made by the chairman of the committee, it seems to me there was some question as to whether we should confine the work of the committee to the chronicle of our history, or proceed with the establishment of a museum, which seems to be the chairman's idea. I move that the report be submitted to the executive committee to make what disposition of it as shall seem best. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: The motion has been made and seconded that the report just made by Dr. Murphey be referred to the executive committee for such action as to them may seem fit. Any remarks? All those in favor of the motion make it manifest by saying "aye." Opposed "no." The ayes have it. It is so ordered.

At the last session you instructed the president to appoint a committee of three to select a committee of five to act as the Salmon Memorial Committee. I appointed on that committee Drs. Hughes, Moore and Dunphy. If they are ready to report, I will call for that report at this time.

DR. HUGHES: I would state that we found it impracticable to limit this committee to five. Your committee appointed to select from the membership of the A. V. M. A. a number of names of members who might act as a standing or permanent committee for the purpose of arranging for the collection and administration of a fund to be known as the "Salmon Memorial Fund," beg to report that in their opinion this committee should comprise at least seven members which should be selected from diverse geographical locations, all of whom intimately knew and had high regard for the late and much lamented Dr. Salmon. The names of the following seven gentlemen are herewith respectfully presented by your temporary committee for your consideration: Dr. A. D. Melvin, Washington; Dr. J. A. Rutherford, Canada; Dr. J. F. Winchester, Massachusetts; Dr. W. H. Hoskins, Pennsylvania; Dr. S. Brenton, Michigan; Dr. J. A. Anderson, Nebraska; and Dr. D. F. Fox, California. I might mention that we found it utterly impractical to cover the ground with a smaller number than seven and we think it will redound to the value of the committee if the number is kept at seven. We did not make any attempt at all to indicate what should be expected from this committee, preferring to let the association work that out. Dr. Moore, I believe has some remarks to make with regard to what New York has already done in this respect.

PRESIDENT MARSHALL: Gentlemen, you have heard the report of the committee appointed to make suggestions as to the personnel of the committee. They have selected seven instead of five as ordered by you this morning. What do you wish to do with the report of the committee?

DR. MURPHEY: I move that the report of the committee be accepted.

DR. KINSLEY: I believe I made the motion that five should be appointed. Can I spread that to cover seven?

PRESIDENT MARSHALL: If the seconder of that motion will agree.

DR. KINSLEY: Is it understood one of those men will be appointed anew each year, or is the entire committee to be elected for seven years?

DR. HUGHES: We have made no suggestions in that respect. We would prefer to have the association decide.

DR. FAUST: I am willing to accept that change on the seven-year basis. I seconded Dr. Kinsley's motion this morning.

DR. DUNPHY: I was not in the room at the time I was named on this committee and I believe that all members of the committee were not certain that the motion confined us to five. We were not quite clear whether the committee was to select a committee or to select a definite number. We believed the territory would be covered in a better manner by seven than by five. The fact that the association has meetings on both sides of the continent, led us to think we would be more apt to have one or more representatives of that committee at each meeting by having a little larger committee and that it would cover the ground much better.

PRESIDENT MARSHALL: Any remarks?

DR. SCHNEIDER: I will suggest, if it is in order to make a motion to that effect, that the number be retained at seven and that two shall be re-elected every year, making an alternation of four years; two for the first year, two the second and two the third, and one the fourth year in rotation, when every member retires from the committee.

DR. MAYO: As I recall the motion this morning, it provided that the committee should consist of five; one to retire and one to be elected each year. If we have a committee of seven and one retire each year, it will not be necessary to mention the number of years, because it would take seven years instead of five.

PRESIDENT MARSHALL: Did the committee state whether the president was to appoint this number or were they to be elected by the association?

DR. HUGHES: I would state that we made some inquiries, at least I did, and got information which led me to believe that it would be better to merely select the names, and submit them, and let the association take subsequent action.

PRESIDENT MARSHALL: Then I think I understand the question this way: The committee has recommended seven men for the Salmon Memorial Committee, and we can select or reject those as we please, and if they are selected, then we can state later how they shall be appointed hereafter and the length of time each shall serve. Is that the way it is understood?

(To be continued)

SOCIETY MEETINGS

THE MASSACHUSETTS VETERINARY ASSOCIATION

The regular monthly meeting of the Massachusetts Veterinary Association was held at the Quincy House, Boston, on March 22. In the absence of President Plaskett, Vice-President Peirce presided. The records of the January and February meetings were read by the secretary, and approved as read. The secretary notified the association that the motion passed at the previous meeting contributing \$75. for the Salmon Memorial Fund, which was in addition to the \$25. previously voted, was not effective, inasmuch as the records showed that \$25. had not been previously voted. It was then moved and carried that the association appropriate the sum of \$100. to the Salmon Memorial Fund.

Dr. Brownell reported that he had attended the hearing of the Good Road Bill before the Legislature to represent the interests of this association. He reported considerable enthusiasm, and a favorable report from the committee. This bill is to compel the building of roads which are safe for horses to travel instead of the hard, slippery, asphalt roads which are now being built.

Dr. Cahill reported for the Directory Committee, and gave estimates from printing companies. The association then voted the sum of \$50. for the use of the Directory Committee in publishing a directory to include all registered veterinarians in Massachusetts.

The illness of Dr. Abele was reported to the association, and the secretary was instructed to send a letter and flowers, expressing the sympathy of the association.

The application of Dr. Samuel T. Howland was presented for membership. On motion, the secretary cast one ballot, electing Dr. Howland to membership.

Dr. L. L. Peirce spoke on the Milk Bill which is before the Legislature, which was followed by a spirited general discussion.

Dr. Cahill, for the Salmon Memorial Fund, suggested that the association finance an appeal to be sent to all registered veterinarians in the state toward procuring subscriptions for the Salmon Memorial Fund. The association voted to do so.

Dr. Hugh Dailey of the Angell Memorial Hospital then talked on Canine Distemper. Dr. Dailey spoke of his extensive experiments with this disease, and mentioned the fact that authorities

agree only on the post-mortem lesions. His personal opinion is that this is a protozoan disease, and that the flea is largely responsible for the transmission of the disease. He firmly opposed the promiscuous use of serum, either as a preventive or as a cure, and recommended most highly the use of quinine and calomel in large doses. He stated that in his opinion the only value in the use of serum was in promoting phagocytosis, but said that oil injected subcutaneously would do this just as effectively or even more so, and that it would not cause paralysis, which sometimes follows the use of serum. Dr. Dailey said that his best results were derived from 1/10 grain of calomel and from 2 to 15 grains of quinine in capsule four times daily from four to five days. If carried on longer than this, it may cause severe meningitis. He also urged the use of normal saline solution combined with olive oil, when extreme exhaustion is present, and discouraged the use of strychnine. In place of strychnine, he advocated the use of caffeine, camphorated oil, or ether. He did not favor forced feeding, and stated that the most favorable cases to treat are the ones which have a bad discharge from the eyes and nose. Considerable discussion followed Dr. Dailey's paper, after which he was given a rising vote of thanks.

The secretary read a letter from the A. V. M. A., regarding the Longley Committee for the selection of an emblem. This matter was laid on the table until the next meeting.

EDWARD A. CAHILL, Secretary.

THE MASSACHUSETTS VETERINARY ASSOCIATION

The annual meeting and banquet of the Massachusetts Veterinary Association was held at the Quincey House, Boston, on April 26. The meeting was called to order by President Plaskett. Records of the previous meeting were read and approved. The president appointed a nominating committee, composed of Drs. Frank Sturges, Elmer Babson, and Benjamin Pierce.

The secretary-treasurer read his annual report which summarized is as follows:

New members for the year.....	13
Deceased	3
Exempt from further payment of dues because of 25 years in good standing	11
Expelled from membership.....	11

Money in the treasury April, 1915....	\$290.02
Monies received for dues.....	213.00
	<hr/>
Total	\$503.02
Expenditures	301.65
	<hr/>
Balance	\$201.37

The report was accepted as read.

The secretary then read the Longley letter, regarding the emblem for the A. V. M. A. After considerable discussion, it was moved that the secretary be instructed to notify the committee that the association recommends the blue cross with white background for first choice, and a blue star with white background for second choice.

Dr. Cahill, for the Salmon Memorial Committee, reported that he had sent out notices to every member of the association with the current notice, and asked the association to finance sending the appeal to all registered veterinarians in the state who are not members of the association. Moved and carried that the association finance this appeal. Dr. Winchester spoke regarding the Salmon Memorial Fund, and his remarks were followed by a motion by Dr. Cahill that the chair appoint Dr. Winchester a committee of one to appeal to all present for a contribution. The motion was carried. Several contributions were received during the evening by Dr. Winchester.

Dr. Winchester spoke on the Army Veterinary Bill, which had passed the House and Senate. The secretary read Senator Lodge's speech in Congress. Moved by Dr. Harry Peirce, that a committee of three be appointed to draw up a suitable letter expressing the gratitude of this association to Senator Lodge for his efforts. Dr. Cahill remarked that while we owed considerable to Senator Lodge, it should not be forgotten that the moving spirit and the hard work of the entire affair was Dr. Hoskins, and that the greater credit should be given him. He moved that the same committee frame a suitable letter to be sent to Dr. Hoskins. Unanimously carried.

For the Directory Committee, each member of the committee presented a report, which included both the majority and the minority report. After considerable discussion, the majority report was accepted, and the committee instructed to proceed with the directory.

The secretary reported that he had sent flowers to Dr. Abele, while sick, as directed, and that he had also sent flowers after Dr. Abele's death, and also a floral offering at the request of the treasurer of the A. V. M. A. for that association. He then read a letter of thanks from Mrs. Abele. The association voted to reimburse the secretary for these flowers.

Moved and carried that a committee of three be appointed to draw up resolutions on Dr. Abele's death. Drs. John Robinson, Harrie Pierce, and H. D. Clark, appointed. The chair appointed the following committee to write Senator Lodge and Dr. Hoskins:—Drs. Lester Howard, Samuel Emerson, and John Winchester.

Dr. Winchester read resolutions presented to Congress calling for investigation of dairies, and creating dairy inspection and supervision of milk and dairies to be nation wide in character.

The applications of Dr. Thomas Doyle of Natick, and Dr. Pell Wallingford of Waltham, were read and laid on the table for one month.

The nominating committee reported the following nominations: For president, Dr. Harrie Peirce; first vice-president, Dr. W. H. Dodge; second vice-president, Dr. W. M. Simpson; secretary treasurer, Dr. Edward A. Cahill. The nominees were then unanimously elected.

Following the meeting, about seventy members and friends partook of an exceptionally good seven course banquet. This was followed by the chief speaker of the evening, Dr. Adolph Eichhorn of Washington, D. C., who spoke on "Biological Therapeutics." His paper was one of the best ever presented to this association, and was most closely followed by all present, causing considerable discussion.

Dr. Milton Perry of Framingham gave a most interesting description of his experiences in conveying horses to the allied armies. Short talks were also enjoyed by the members from Senator John B. Hull of Gt. Barrington, Representatives Dr. J. H. McAllister of Lee, George D. Chamberlain, and Arthur E. Marsh of Springfield.

Before adjourning a silent toast was drunk to Drs. Francis Abele, Jr., and Madison Bunker, who departed during the year.

EDWARD A. CAHILL, Secretary.

COMMUNICATIONS

Editor of the Journal of the American Veterinary Medical Association, Ithaca, N. Y. Dear Sir:

In the May issue of the *A. V. M. A. Journal*, is an article by F. M. Perry, Framingham, Mass., concerning the official authority of veterinarians on board steamships transporting horses and mules "to Europe," for war purposes. I feel duty bound to advise that all ships and transportation companies are nothing like Mr. Perry's description of the one he was on.

I have sailed out of New Orleans with something like a hundred men under me, and what I said concerning mules "and their care," went.

The head foreman under me, "did not have any authority over me," or the assistant foreman and muleteers, other than to carry out my orders. I had entire control over water, "feeding," treatment, etc., etc. I did not have any trouble whatever in getting all of my money. The officials on land and sea were all that one could wish for. They were mighty obliging to me in London, and in fact, wherever I found officers. Concerning medicines, I was sent aboard the ship "before loading," where I took an inventory of the drugs and supplies on board; then I filled out my want list of everything I wished, namely, fluid extracts, H. P. tablets, tinctures, antitoxins, etc., etc., and I had medicine to "burn." Of course I had a fine ship, and new, owned by a good company, but I felt that it was my duty to inform the profession that every veterinarian's experience is not disappointing. I consider the work very pleasant, and the pay is ample in my judgment.

Trusting this may scatter some of the clouds, I beg to remain,
Very Respectfully, F. L. PARSE, V.M.D.,
Columbia, Miss.

TO ORGANIZATIONS INTERESTED IN OUR FOOD SUPPLY:

In a brief but serious preliminary hearing on my resolution (House Res. 137) before the Committees on Rules, calling for an investigation of conditions in the collection, manufacture and distribution of dairy products in interstate commerce, some of the testimony showing the absolute necessity of this investigation was as follows:

Dr. A. D. Melvin, Chief of the Bureau of Animal Industry, Department of Agriculture: In answer to the question, "Is a large percentage of the dairy products that are consumed by the American people unfit for food, or not?" Answered: "We think so."

Dr. Melvin also said when asked if the proposed investigation is necessary, "Yes, I think an investigation would be very helpful."

Dr. E. C. Schroeder, Scientist of the Bureau of Animal Indus-

try, said, one dairy cow in ten has tuberculosis and is capable of transmitting that disease to children. That thousands of children under sixteen years contract bovine tuberculosis through eating butter and milk, contaminated with bovine tubercular bacilli. That his and many other investigations show that in every year 6,000 children under five years die of bovine tuberculosis.

Dr. John R. Mohler, Scientist of the Bureau of Animal Industry, said he had personally examined the bodies of nine children who died of tuberculosis and found that two of them died from the bovine form of the disease. That a very large per cent of bone diseases in young children is bovine tuberculosis.

Dr. Mohler also said that bovine tubercular bacilli remain alive and virulent in butter for at least six months, while in cheese the bacilli were alive at the end of 281 days.

Mr. William T. Creasy, Secretary of the National Dairy Union, says the Union favors the proposed investigation, but the organization he represents and other similar organizations are fighting my resolution at every step.

I feel we should know whether or not the terrible charges made by the government's scientists are true.

Shall we stand idly by while every year 6,000 babies die from a preventable cause and many more thousands suffer untold torture?

If you agree with me on this proposition will you please write at once to your Congressman, in care of the House of Representatives, Washington, D. C., expressing your views and asking him to favor this resolution which means so much to every man, woman and child in the United States? J. CHAS. LINTHICUM.

At a meeting of the National Records Society held in Washington, D. C. in May, a resolution was passed urging the Secretary of Agriculture to partition the present work of the Bureau of Animal Industry among three separate bureaus or offices; one concerned specifically and exclusively with animal diseases to be called the Bureau of Animal Health; one concerned with the encouragement of breeds of live stock and the improvement of the utility stock on the farm other than dairy cattle, and one concerned specifically with the dairy cattle and dairy industry. It is recommended that the heads of these bureaus form a Federal Live Stock Board to administer all live stock regulations under the direction of the Secretary of Agriculture. It is also urged that another assistant secretary of agriculture be appointed to whom the heads of these three bureaus shall be responsible.—From *The Breeder's Gazette*.

REVIEWS

VETERINARY HANDBOOK AND VISITING LIST

THOMAS B. ROGERS, D.V.S.

12 mo.—\$1.50 net.

J. B. Lippincott Company, Publishers, Philadelphia, Pa.

As the title indicates, the book is intended for constant use, and is therefore of convenient size for the outside coat pocket. Reference is made in the 119 pages of text to bacterial therapy; classification of the bacteriological products used in veterinary medicine; the approximate incubative period of the more common infectious animal diseases; prescription writing; Latin phrases; strength of U. S. P. tinctures; poisons and their antidotes; duration of pregnancy in domesticated animals; apothecaries and metric systems of weights and measures; Centigrade and Fahrenheit scales and the Harrison anti-narcotic law.

The major portion of the book is devoted to prescription writing and dose tables for the different classes of animals treated by the veterinarian. Sheep, calves and foals are classed under the same system of doses as to amount. The pigs, classed separately, receives the same doses in the great majority of instances, but with some drugs receives smaller amounts. For the cat the minimum doses for the dog are recommended, as the rule. The dosage is given in both the apothecary and the metric systems. At the end of the book are a number of annotated pages for the records of visits or charges to clients.

The author claims no originality for the subject matter. His work as a practitioner, teacher and member of a state board of veterinary medical examiners, has emphasized in his mind the desirability of such a book. With this there will be many to agree. The mind cannot retain indefinitely the many details of dosage and therapeutic facts. As a book of ready reference the work fills this need and should be of much benefit to the practitioner.

P. A. F.

NECROLOGY

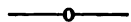
DR. W. C. HOLDEN

Dr. W. C. Holden of Delphos, Ohio, a member of the American Veterinary Medical Association, died at his home, April 16, 1916. **Dr. Holden** had been a patient sufferer for many months with liver trouble and diabetes.



E. S. RICE

Dr. E. S. Rice, the oldest practicing veterinarian in Arkansas, died April 24th at Little Rock, at the age of 77 years. During the past 47 years he was an active practicing veterinarian in the vicinity of Little Rock. **Dr. Rice** was born in Watton, England. He received his veterinary training at the Royal Veterinary College, London. He was always active in the upbuilding of veterinary practice in the state and for the past ten years has worked hard in trying to procure the passage of the veterinary practice act. In 1915 he was the father of the Arkansas Veterinary Practice Act which passed during the 1915 session of the legislature. He was also a charter member of the Arkansas Humane Society.



HARRY W. RIKE

Dr. Harry W. Rike of 735 Linden Ave., Burlingame, California, died April 6, 1916. He was a graduate of the Ontario Veterinary College in the class of 1889, and joined the American Veterinary Medical Association in 1909.

MISCELLANEOUS

VETERINARY CONDITIONS IN THE WAR ZONE. Dr. C. J. Marshall, who was sent abroad by the University of Pennsylvania, left America March 11, 1916 on the Rotterdam for England and France to make observations on the care and treatment of horses in war. He obtained permission from the War Department of each country to inspect the veterinary hospitals and remount stations in the two armies. The veterinary service is remarkably well organized. Many of the best veterinarians in both countries are engaged in this work. The army veterinarians are all highly educated. They have at least a high school preliminary education with a four years' course in a veterinary college. After this preparation they are given a cavalry training. They are given rank as high as Major General.

The veterinary hospitals are equipped with an abundance of help, forage, medicine, instruments and everything required to give horses the best care and treatment. At the beginning of hostilities conditions were not favorable. Many difficulties and discouraging features have been overcome. There have never before been such facilities and organization available or so much consideration and recognition given the army veterinary service as in the present war. The results are among the highest accomplishments of the veterinary profession.

The horrible suffering reported among army horses is entirely unfounded. There is nothing pleasant about war but horses as a rule are as considerately and kindly treated as the men are. The average life of an army horse has been reported as five days. In the two armies visited many horses were seen that had been in service since hostilities began and the horses as a rule looked as well as the average contractor's horses in America.

Returning, he sailed from Bordeaux on the S. S. Touraine for New York and arrived on May 9th with the highest praise for the good work that is being done in caring for disabled horses by the English Army Veterinary Corps, the Royal Society for the Prevention of Cruelty to Animals and the Blue Cross.

Dr. W. P. Hill from the Sixth Cavalry, who is representing the U. S. War Department, is in Paris. He left America early in January and is planning to remain in France till the end of the war. He should obtain valuable information in reference to the organization

of the veterinary service which will be of special interest in reorganizing this service in our army. The organization of the work is of much importance at present from the fact that rank and recognition is about to be given our army veterinary service.

Civil service examinations will be held in California the third week in June to provide an eligible list from which to appoint assistants to the state veterinarian. Several appointments at \$1500 a year are to be made on October 1, 1916. The examination is open to residents of California who are graduates of recognized veterinary colleges. Further particulars concerning the examination may be obtained from the State Civil Service Commission, Sacramento, Calif.

COMPULSORY TUBERCULIN TESTING AND PASTEURIZATION IN CALIFORNIA. On October 1st, an act of the California legislature became effective, the enforcement of which is of particular interest to the veterinary profession.

This law provides for the compulsory testing of all cows in this state from which milk or cream is sold at retail in a raw or unpasteurized condition. All milk or cream which is the product of cows which have not passed the tuberculin test must be pasteurized by the holding process before it is sold or made into butter.

In addition, all milk sold under the jurisdiction of a city or county milk inspection service must be graded into five classes.

Dairymen who sell in bulk to the wholesale trade need not have their cows tested. This includes all who sell exclusively to creameries. In this case, the responsibility for pasteurization rests with the creamery or the retailer.

The fifteenth annual meeting of the North Dakota Veterinary Association will be held at the Veterinary Building, Agricultural College, Fargo, N. D., three days, during the State Fair, July 18, 19, 20.

The U. S. Department of Agriculture publishes a booklet containing the abstracts of the veterinary law of each of the states with the titles and addresses of those in charge of the enforcement of such laws. The booklet is complete and kept up to date. Copies may be obtained by those interested in the interstate shipment of animals.

Dr. C. H. Stange of Ames, Iowa, is convalescing at Excelsior Springs, Missouri.

At the last meeting of the Tennessee Veterinary Medical Association at Chattanooga, the following officers were elected: J. H. McMahon, president; E. M. Cully, first vice-president, G. P. Whittington, second vice-president; F. W. Morgan, secretary; W. L. Coplin, treasurer. There was a good attendance and a fine clinic. The next meeting will be held at Humboldt, November 8th.

Dr. R. M. Bell is assisting Dr. W. G. Hollingworth at Utica, N. Y., in his practice.

The Alumni Association of the United States College of Veterinary Surgeons held their annual meeting at the Raleigh Hotel, Washington, D. C., on Friday evening, April 14th. Seventy-five members were present. During the business meeting the following were elected to office: H. S. Gamble, '08, president; C. F. Miller, 16, vice-president; C. M. Mansfield, '07, secretary-treasurer. A social program followed which consisted of music and talks. A buffet luncheon was served. The next meeting will be held Saturday evening, April 14, 1917, at Washington, D. C.

The joint meeting of the California State Veterinary Medical Association and the Southern Auxiliary California State Veterinary Medical Association will be held in Los Angeles June 21 and 22.

Dr. C. J. Marshall, after a two months absence visiting European veterinary camps, has returned to Philadelphia. Dr. Marshall's observations will be incorporated in a comprehensive report to be submitted to the trustees of the University of Pennsylvania.

—Public Ledger.

Dr. Liautard writes us that he had the pleasure of a visit from Drs. Marshall and Hill while they were abroad on their official mission.

In an article on "What to Do to Protect our Live Stock," in *Hoard's Dairyman*, Dr. M. H. Reynolds of Minnesota, gives as a part of his live stock sanitary control creed that: "State control work should be in charge of a small non-partisan board of reasonably stable membership. Said board should consist of stockmen and veterinarians. Legal provision should be made that the executive official must be a veterinarian.

"The law should provide that anybody who knows of or suspects the existence of any communicable disease must report to the state under penalty."

The midsummer meeting of the Minnesota State Veterinary Medical Association, will be held in Minneapolis, July 12 and 13.

JOURNAL

OF THE

American Veterinary Medical Association

Formerly American Veterinary Review

(Original Official Organ U. S. Vet. Med. Ass'n)

PIERRE A. FISH, Editor

ITHACA, N. Y.

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VOL. XLIX. N. S. VOL. II.

JULY, 1916.

No. 4.

Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary C. M. Haring, University of California, Berkeley, California. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

A FORECAST

As we are assembling our material for this number, word comes to us of some of the results of the efforts of chairman Merillat and Higgins in building up a program, which shall have interesting and instructional features for the profession at large and even extend beyond the profession to those interested in stock breeding, sanitation and public health as it relates to the domesticated animals.

At this time we can announce that there will be a symposium on contagious abortion; a half-day section on horse breeding and temounts; papers by men of national prominence on surgery, lameness, pharmacology, local anesthesia, animal dentistry, forage poisoning, cholera, canine distemper, shipping fever, calf scours and others, to be announced later. In addition, there will be reports from the various committees which should be of as much general interest to the profession as the program. The report of the legislative committee should be of especial interest this year. Of no less interest should be the reports of the committees on intelligence and education, reorganization, diseases and various others.

Although this is but a brief outline of the good things that may

be expected, it strikes us that it is sufficient to stimulate a large interest in the membership and should insure a large attendance. It should also stimulate much interest among those who are not members and induce many of them to join the association. We hope, at least, that many of them will attend the meetings, at which they will be cordially welcome, and judge for themselves if they cannot further the best interests of the profession, as well as their own efficiency by working with the association.

Mark the date, August 21st, and remember that on that date all roads lead to Detroit. If it has not already been done, make your reservations at the official headquarters, the Statler Hotel, or at some of the other hotels conveniently located, as published in the June number of the JOURNAL.

P. A. F.

IMPAIREDNESS OR PREPAREDNESS

Until recently we have had a notable example of impairedness in the veterinary branch of the army, because of the refusal of the government to grant the veterinarians rank and standing. A jolt is sometimes necessary to arouse one from a lethargy in which he has allowed himself to sink. Our country has untold treasure without adequate protection and has seemed strangely indifferent to its preservation. The possibility of being drawn into the present whirlpool of war, however unwillingly, seems to have aroused some from their lethargy. This possibility has been the jolt which has caused thoughtful ones to take an inventory of our resources and to consider our readiness to repel an invasion, if such were offered. Under changed conditions of warfare, the oceans no longer offer the same protection as in years gone by. A nation contemplating war does not publish its plans in advance. War may come unexpectedly and there is but little time for preparation,—if it has not already been made. There are not many nations which have reached that degree of Christian humility that when smitten upon one cheek they will turn the other cheek also, and will welcome a foreign power as an overlord. Considerations of this character have demanded and caused the passage of an army bill with which has been carried a more adequate recognition of veterinary service.

The present war, among other things, has emphasized the necessity for an adequate and competent veterinary branch. It has

done more. It has shown that it is of the utmost importance to have an abundant supply of horse material available in time of need and that this material should be of the highest quality. With Russia as the only exception, the United States is the greatest producer of horses in the world. It has been estimated that out of the 24,000,000 horses in this country, only about 224,000 are of the type suitable for military purposes. Something less than one per cent of what we have are suitable for our use in case of necessity. Even this small percentage has been depleted by export during the last two years. It is folly to assume that foreign agents have accepted for use of their governments, anything that would pass as a horse. There is no question that we have the quantity, but the quality of the horses is the serious problem. The significance of our present impairedness in this direction is emphasized by the fact that during one year of the Civil War the government purchased 221,000 mounts.

Have we adequate army veterinary service to properly care for this number and the many more that would be required in case of another and perhaps greater war? The effort to establish a veterinary reserve corps and the voluntary response of a goodly number of patriotic veterinarians to serve in this way is most gratifying. It is hoped that enough momentum may be gained to compensate, to some extent, for the inertia of the past.

It has been stated that some of the newer and important agents used in the present struggle were invented in this country and offered to our government, which was not interested, and then disposed of abroad where they have been perfected and lost to our exclusive use. Others have prepared from our inventions while we have generously impaired our own efficiency. This procedure should not extend to the type of horse required for military use. The scrub should be allowed to die out and only the best of the various types propagated for future use. Foreign governments have spent thousands where we have spent hundreds, or less, for this purpose. Our government will find it a paying investment to encourage and stimulate stock breeders to interest themselves in the better types only.

Associated with the horse are roads. Again, the present conflict has emphasized the necessity for good road-beds. Railway facilities have been shown to be inadequate, and for greater mobil-

ity of troops and quick dispatch to isolated areas, good roads have been imperative. It has been possible, by their presence, to snatch victory from defeat in many instances. It is not to be inferred that the mobility and quick dispatch of troops is dependent upon the horse so much as upon the use of motor-cars, but the good roads are advantageous for horses as well as motors, and the horse has the further advantage that he can go where the car cannot.

Good horses and good roads are imperative in war; they are quite as essential in peace, and both concern the veterinarian. It is difficult to see how the most extreme pacifist can object to these forms of preparedness. It is not a question of preparedness alone, but a question of thrift against waste; of efficiency against inefficiency. The one promises a useless sacrifice of life and treasure; the other safeguards them. Money is cheaper than life. Let us woo peace even if it requires super-preparedness. Our country is concerned with the divine rights of humanity. We believe that the principles upon which this government was established are worth living for in peace and dying for in war.

P. A. F.

IMPROVEMENT IN THE PREPARATION OF ANTI-HOG CHOLERA SERUM

In an article by Drs. Dorset and Henley of the Biochemie Division of the Bureau of Animal Industry, appearing in a recent number of the *Journal of Agricultural Research*, was described the production of a clear and sterilized anti-hog cholera serum. It is certainly gratifying that with the simple procedure as devised by these investigators it will now be possible to prepare a product which will in all respects prove more satisfactory and also more scientific.

There is no doubt that hog cholera serum has probably been the most important biological product produced in recent years, and its effectiveness in hog cholera caused by the filterable virus is no longer questioned.

Hog cholera serum, however, in its former preparation represented a crude product, frequently contaminated with various kinds of germs. This shortcoming was mainly responsible for much just criticism as to the efficiency and potency of the product. and

veterinarians no doubt have also very frequently despaired on account of bad results which followed its administration. Septic and pyemic conditions not infrequently followed the injection of contaminated serum, and we are not at all certain whether the increased number of cases of polyarthritis and multiple abscesses in hams observed in the abattoirs might not have been directly due to contaminated serum.

The simplicity of the technique described by Dr. Dorset as required in the production of his clear and sterilized anti-hog cholera serum will no doubt revolutionize this product, and it is hoped that veterinarians in the near future will be in a position to avail themselves of this improved and highly important preparation.

In the clear serum all of the anti-bodies of the blood are contained, and only the inert blood corpuscles are eliminated, which is another advantage, since it no doubt hastens its absorption. The possibility of heating the same to 60°C., or passing it through a Berkefeld filter should also appeal to the users of this product, since through filtration the obnoxious contaminations may be removed, and with the heating the danger of the possibility of a serum contaminated with foot-and-mouth disease virus is avoided.

Drs. Dorset and Henley deserve the hearty congratulations of the veterinary profession for their new achievement, and it is hoped the method will soon be adopted on a large scale by commercial producers of serum.

A. E.

U. S. VETERINARY INSPECTORS

It is quite generally recognized that the veterinarians in the federal meat inspection are underpaid. This is not due to any fault of the Bureau of Animal Industry but rather to the limitations of the appropriations available for its use. That the work involved in this branch of the service is of great importance cannot be successfully controverted. It is therefore necessary that the inspectors must be of a high grade. They must be graduates of reputable veterinary colleges and must have spent considerable time and money in acquiring a sufficient education for the purpose. To hold such men, when ordinary practice usually brings in greater incomes, it is essential that adequate salaries should be paid—or else the service loses.

An effort is being made to place the matter on a more stable and just foundation through the Lobeck bill, which provides for a salary of \$1400 on entering the service and an annual increase of \$100 thereafter until the salary shall amount to \$2400 per annum. It is gratifying to report, at this writing, that the committee has voted to make a favorable report on this bill to the House and that within a few days it will be placed upon the House calendar. It will also be introduced into the Senate at an early date. It is obvious if the government is to retain the best men in this branch of its service, it must pay adequate salaries. The Bureau inspectors and clerks, as well as the profession at large, should feel under great obligation to Mr. Lobeck for the interest and energy he has shown in promoting this act of justice.

P. A. F.

IMMATURE MEAT

Practically all of the legislation against the use of immature meat has been centered around veal. We have heard little or nothing about lambs or pigs; yet it is reasonable to infer that such meat is just as dangerous from one source as another. The calf seems to have been the recipient of much class or special legislation. There have undoubtedly been more attempts to use immature calves than of the others. Yet the fundamental principle is the same in all and legislation should be impartial in a matter of this character.

If there has been one reason more emphatic than any other in hampering efficient inspection in this direction and more illogical in principle, it has been legislation specifying the age limit. There has been no attempt at coordinating this time limit between federal, state and municipal authorities. This has resulted in a most chaotic state of affairs and presented many opportunities for controversy. In some sections a veal is legally immature until it is three weeks of age; in others, it must be at least six weeks old. There is a difference of 100% in this age limit and this range seems unnecessarily wide. Just what is the determining factor, aside from the age, is not clear. That age ordinarily confers more maturity is incontrovertible, but it does not determine that younger veal is unwholesome or harmful. In cases brought to court, the crises, in many instances, develops around the age limit. If the burden of proof is

placed upon the inspector, he must possess superhuman qualities, in the absence of definite information, to swear to the exact age of the animal. Conditions of this character afford fertile opportunities for legal complications. These complications are not always creditable to the prosecutors. Opinion has been superior to evidence because until late years there has been no very direct evidence. A newspaper commenting on some of this evidence, stated its position as favoring the opinion of physicians who pronounced that bob veal was harmful if not actually poisonous, rather than to accept the evidence of harmlessness. It preferred prejudice to proof. There has been evidence for some time in the practices of foreign countries in consuming, what would be condemned in this country as immature meat, without apparent detriment to the health of the consumers.

The work of Berg of the Bureau of Animal Industry has shown that from a chemical standpoint the differences between immature veal and beef were negligible and from experiments in artificial digestion and feeding tests on cats that the physiological differences were insignificant. There has been previous confirmation of some of this work and there is a satisfaction in having direct evidence from a federal department in this matter rather than speculation.

To those properly trained it may not be especially difficult to detect either extreme as regards mature or immature meat, but the borderline between the two requires superhuman powers. To determine it by the age limit is entirely unreliable because of the physiologic differences that exist in each individual from the fetal stage onward. The criterion should be the quality of the meat; some immature meat may be unwholesome just as some mature meat may be unwholesome, and this can be determined by careful inspection. The statements that immature meat is deleterious to the health, if not actually poisonous, need modification. The same standards of inspection should apply to all meats—quality and wholesomeness. Without the complex question of age limit, there is less likelihood of litigation and, in some cases, possibly less unintentional perjury.

Age does not necessarily confer either health or wholesomeness. There are some qualities which may be recognized as more or less characteristic of immature meat, and these the Bureau of Animal Industry, since November, 1914, has recorded as follows: "Carassus shall be considered too immature (and this refers to pigs, kids

and lambs, as well as calves) to produce wholesome meat if the meat has the appearance of being water-soaked, is loose, flabby, tears easily, and can be perforated with the fingers; or its color is grayish red; or good muscular development as a whole is lacking, especially noticeable on the upper shank of the leg, where small amounts of serous infiltrates or small edematous patches are sometimes present between the muscles; or the tissues which later develop as the fat capsule of the kidneys is edematous, dirty yellow or grayish red, tough and intermixed with islands of fat."

Experience may demonstrate the desirability of subtracting from or adding to these clues, but there is at least something more definite here than guesses at the age of the animal. We believe the Bureau has taken a progressive stand on a sound basis, and we cannot do more than commend it to the careful consideration of the legislators of the various states and municipalities as a wise example for them to follow. This is one of the questions where uniformity is possible and most desirable in eliminating present confusing conditions as to legal complications, waste and inefficiency.

P. A. F.

EUROPEAN CHRONICLES

Bois, Jerome.

BACTERIOTHERAPY AND WOUNDS. Last year in one of the visits that Prof. Lignieres of Buenos Ayres made to his native country, he presented a communication on this subject before the *Société Centrale*. The application of bacteriology to the treatment of wounds was certainly a subject of interest which could not fail to draw attention inasmuch as the writer of the communication is an authority so well known.

"Today," said the learned professor, "there is no method of treatment of wounds, which would not be interesting, if one knew how to apply it according to the various cases that may exist. It is for that reason that the following observations made on bacteriotherapy are presented.

There are necrotic wounds, where the medicinal substances including serum, reach the deeply injured points only with difficulty. For instance in the horse, those found in some cases of quittor, of poll evil or diseased withers. Could not a microbial

jection bring on or hasten recovery by a specific action in the very organism of the sick individual?

Indeed, when, in cartilaginous quittor, the fistulous tracts are cleaned with the ordinary methods, but without operation, and three or four subcutaneous injections of dead cultures of the necrosis organisms are made, healing takes place with remarkable rapidity. Identical results have been obtained in cases of superficial or deep necrosis of the skin after accidents or burns.

It seems that, under the influence of the injection, the organism makes specific antibodies, which act directly against the microbes of necrosis.

The normal serum of horses can be simultaneously employed at the injured places, while the subcutaneous injections of cultures are kept up.

This method, after all, is not new. For several years its application in human medicine has given excellent results.

It is, in reality, a specific action for which are used injections of the same microbes which give rise to the lesions and the antibodies that are formed are also specific.

But, adds Lignieres, there is a point to which I desire to bring special attention; it is not only the specific microbes which can bring useful action in the recovery of wounds, other foreign microbes of different species are also able to produce in the organism antibodies which assist in the recovery. It is, however, better to give the preference to the specific action as it is the surest and most efficacious.

Observations have indeed shown the possible utility of the injections of microbes foreign to the disease. The vaccine for anthrax, injected in a flock, where there was a disease which had nothing to do with the bacteria of Davaine, has for several days arrested the disease, and even exceptionally completely subjugated it. Lignieres has often made the same remarks with the antipasteurellic vaccine. After immunization against bovine piroplasmosis, consisting of intravenous injection of blood from sick animals, in which the parasite had been killed, many times a preventive action against foot-and-mouth disease has been observed. These observations are not coincidences but facts very often repeated.

Another demonstration more evident is shown in the fact that a wound rebellious to cicatrization or having a tendency to become

again infected, will show a hasty march towards recovery by the injection of a microbe, foreign to the sore, the coli bacillus for instance. The reaction that this dead microbe will promote in the organism, will then act very strongly in favor of recovery, by stimulating the normal defenses, by promoting the formation of antibodies and by phagocytosis.

To summarize: the injections of specific microbes, killed by heat or any other method are beneficial to the recovery of the lesions provoked by the same microbes.

The injection of microbes of another species, although less certain, may also have a similar effect.

Upon inquiries made by Prof. Moussu on the subject of doses of the solutions to be injected, Lignieres pointed out that it was not necessary, as in man, to enumerate the microbes. In the case of the microbe of necrosis, he has injected under the skin 100 c.c. of killed culture, repeating 3 or 4 times every other day. No abscess or general reaction took place. After the 5th or 6th day the effect was already visible but if smaller or weaker doses were used, no effect was manifested.



WOUNDS AND SERA. The long series of terrible events accompanying the war, has unfortunately been the occasion for various observations of wounds of all kinds and for their treatment. Aseptic and antiseptic measures, compounds of all kinds have been used, all varying more or less according to the nature of the injury, its pathology, microbiology, etc. In several chronicles as well as in abstracts from other periodicals, I have kept the readers of the JOURNAL informed as much as possible with the current of what was taking place from the booming of the application of tincture of iodine to the more recent serum. A fair idea can be had of the progress and of the changes that have occurred in the treatment of wounds, in human and in veterinary practice, and in several instances deserving attention has been given to the polyvalent serum of Leclainche and Vallée.

This serum which has been the object of high recommendation in human surgery and which, by the published notices in foreign as well as in continental scientific and professional papers, has received at the hands of veterinary practitioners, the welcome it deserves. Our professional contemporaries now begin to record the results obtained from its use.

Among the many publications relating to it, there is in the *Bulletin de la Societe Centrale* a report presented by Principal Veterinary JACOULET, on the treatment of diseased withers, poll evil, cartilaginous quittor, deep wounds of the foot by punctures, castration, abdominal cryptorchism, which show the great benefit that has been obtained by the use of the polyvalent serum above named. It has succeeded in most of the severe wounds under consideration.

From all the cases recorded by M. Jacoulet there is one which appears to me so special that I cannot help referring to it in a concise manner.

It is a case of poll evil and diseased neck. A very severe case, which was treated with the serum only and in which a complete recovery was obtained without any other antiseptics, in twenty-four days.

In a few words the case was this: A seven year old black mare had distemper and as she got over it, showed a swelling, warm and painful in the middle of the shoulder and one at the poll of the head. The first was resolved with a blister, the second became an abscess as big as both fists. It was open-treated and seemed to be doing well when a large and painful enlargement appeared on the anterior half of the superior border of the neck. An incision was made on both sides of the neck. The cervical ligament was extensively diseased. The cervical ligament was excised and a piece thirty-four centimeters was cut off. Necrosed lamellar portions were removed. The occipital bone was diseased and scraped. The wound that remained measured 36 centimeters in length on one side and 16 on the other. It had a depth of 12 centimeters. No antiseptic mixture was used. Only ampoules of polyvalent serum, four in the first days and gradually reduced until the 20th day after the operation. On the 24th day, the wound was entirely closed and the mare at work. She carried her head normally and there was only a slight deviation of the superior border of the neck in the part where the cervical ligament had been amputated.

An ordinary surgical interference in such a case, followed by one of the advocated antiseptic treatments would have required long months to realize the complete recovery that the polyvalent serum accomplished in TWENTY-FOUR DAYS. Aside from destroying the microbes and superficial cellular elements, it differs from antiseptics by giving rise to changes in the wounds which inhibit microbial de-

velopment and gives to the cellular elements of the organism a new strength and vigorous action.

INTRA-SPINAL INJECTIONS OF GASES. Perhaps the therapeutics of small animals can be benefitted by this new method of treatment inaugurated by Doct. Felix Ramond which is recorded in the *Presse Medicale*.

Experiments made on dogs, two years ago, have shown him that some gases could be introduced with impunity, into the spinal canal, providing their injection did not surpass in volume that of the cerebro-spinal liquid removed first. A greater quantity may give rise to phenomena of temporary compression, which are, however, only mild in character.

The cerebro-spinal system of man tolerates those injections as well as animals. For that reason Doctor Ramond has attempted to treat some painful manifestations, with some rather encouraging results, as for example those of tabes, headache and sciatica, by the intra-spinal injections of sterilized air.

Also by analogy he was tempted to arrest the progress of tuberculous meningitis by bringing the cerebro-spinal nervous centers in immediate contact with sterilized air. The result was relatively fair. It is true that death of the patient took place but there was a prolongation of life that his condition did not justify.

Oxygen is tolerated as well as sterilized air. It was indicated because of its antiseptic qualities in the treatment of cerebro-spinal meningitis which could not be treated by specific treatment, by the anti-meningococcic, anti-parameningococcic and streptococcic sera.

The author records four cases of meningitis from which 40 centimeters of purulent cerebro-spinal fluid were extracted and replaced by the injection of 20 centimeters of oxygen. The treatment was followed by complete recovery, as indicated by the clinical symptoms and the clear appearance of the spinal fluid.

The intra-spinal injection of colloidal gold is supported better than the intravenous; that of oxygen, providing it is not beyond the volume of the purulent fluid removed, does not give rise to special reaction. The combined injection of gold and oxygen seems more efficacious than when only one is used.

ANOTHER TREATMENT FOR TETANUS. It is from the *Presse Medicale* that I extract the analysis of a recent article entitled STUDIES ON TETANUS. After giving in two chapters, general considerations on the development of the infection and on the clinical manifestations of late tetanus, following a preventive injection of serum, the author in a third chapter considers the use of the persulphate of soda in the treatment of the disease.

The destructive action of oxydizing agents and especially of the alkaline sulphates on the tetanic toxin is well known. After many positive experiments made on several hundreds of animals, injections of persulphate of soda were introduced in human medicine and valuable results have been obtained. Out of 33 cases of tetanus which were submitted to the treatment, 16 recoveries were obtained, with thirteen deaths by tetanus and four from other diseases occurring after recovery from tetanic infection. Such results have never been obtained by any other mode of treatment.

The treatment consists of venous injections made once or twice a day, according to the severity of the case, of 20 c.c. of a solution of persulphate of soda, pure and neutral at 5%. These injections can be kept up for 8 or 10 days, regulating them according to the symptoms. They are reduced when the attacks subside or repeated again if they continue.

Immediately after the administration of the injection, the spasmodic manifestations pass away or are extremely reduced. However, some permanent contractions do not seem to be affected by the treatment, the trismus, the contraction of the abdominal muscles and the stiffness of the neck may last for some time.

Because of the repeated failures of the treatment now advocated, perhaps persulphate of soda may be worth trying by veterinarians.

A. LIAUTARD.

The Western New York Veterinary Medical Association held its third annual meeting at Buffalo, N. Y., June 28. A clinic was held in the afternoon after which there was a dinner at the Touaine Hotel. The program in the evening included papers on The Effect of the Milk Law upon the Production of Market Milk; The Buffalo Milk Supply; a discussion of Catarrhal Fever in Cattle; Reports of Cases and discussion of same.

THE DEVELOPMENT OF IDEAS REGARDING THE PREPARATION AND USE OF ANTI-RINDERPEST SERUM.

ARCHIBALD R. WARD

Bureau of Animal Industry, Washington, D. C.

While rinderpest is not likely to occupy the attention of the profession as a field problem within the continental United States, yet the disease should afford interest to American veterinarians because of the close parallelism existing between it and hog cholera, especially in connection with prophylaxis by antisera. Hyperimmunization, the use of normal salt solution for peritoneal washing, potency tests, the serum alone method, and the simultaneous use of virus and serum are practices common to the management of both diseases. The literature of rinderpest is widely scattered in publications not readily accessible and consequently not familiar to many in America, and further contains many discrepancies in statement that have only recently been rectified. Consequently a review of the development of ideas concerning anti-rinderpest serum, supplemented by abundant references, is presented for consideration.

The value of immunity in preventing rinderpest has long been known. Gamgee (1) in his book on The Cattle Plague, published in 1866, cites the work of Dodson in 1754 in which it was recommended that immunity be induced by inoculating calves with virulent material. This method was widely practiced in Europe and in some cases the death rate was remarkably low. This was particularly true among the cattle on the Russian steppes where the disease ran a mild course.

Koch (2) in 1897 reported to the Secretary of Agriculture of Cape Colony "that blood serum of cattle which have recovered from rinderpest had a certain immunizing effect upon healthy stock when inoculated with it." He drew a large quantity of blood from an immune and injected 100 c.c. of the serum into another animal which received 1.5 c.c. of rinderpest blood the day after the serum injection. The animal remained well for six days when it was injected with 1 c.c. of rinderpest blood to test the immunity and no sickness resulted.

*Presented at the meeting of the A. V. M. A. Section on Sanitary Science and Police, Oakland, Cal. September, 1915.

Looking back over the span of eighteen years since Koch's work and in the light of subsequent developments, his one experiment with 100 c.c. of serum from an immune animal used simultaneously with virulent blood seems to furnish the fundamental idea of the most practical and economical method of combating rinderpest with serum, even though he disparaged the importance of the result at the time. His subsequent work in South Africa seems to have been concerned with immunization with bile, a method long since abandoned. However, later on Koch visited India in connection with the use of serum.

Turner (3) mentions a method of immunizing animals with defibrinated blood of those that had recovered, devised by Theiler and Pitchford and elaborated later by Danyz, Bordet and Theiler. An animal immunized naturally or by the use of bile was injected with 100 c.c. of virulent blood. After the reaction had ceased, blood was drawn. This when defibrinated, was injected into a susceptible animal. At the same time the nose of the animal was smeared with infective material, and to make infection even more certain it was turned in with sick animals. Usually the animal contracted rinderpest, whereupon it was again injected with 100 c.c. of defibrinated immunizing blood—why, is not clear. In the light of present knowledge it seems superfluous.

Kolle, in cooperation with Turner (3) in 1897 introduced the process of injecting immune animals with successive and increasingly larger doses of virulent blood for the purpose as stated by him of producing a serum of higher potency than that yielded by natural immunes. Successive doses in amounts of 10, 50, 100, 200, 500, 700, 1000, 2000, 3000, and sometimes 4000 c.c. were injected in turn as soon as the reaction from the preceding injection subsided. During the work Turner abandoned the use of defibrinated blood in favor of serum on the ground of the poor keeping quality of blood, which prevented holding for potency tests, and further on account of its greater liability to transmit diseases.

The serum was used for curative purposes on a few experiment animals. It was also used in infected herds where the disease was prevalent and had already caused deaths before serum treatment was given. It appears that the superior potency of the serum over that of a natural immune was assumed from these observations on experiment animals and reports of treatment by "farmers and others" who administered it in the field. There is no mention made

of a test of the potency of serum from the same animal or group of animals before and after the procedure that is now designated as hyperimmunization. Such would be the crucial test of what hyperimmunization accomplishes.

Nicolle and Adil-Bey (4) in 1899 modified the method of hyperimmunization by injecting the immune animal with 4 to 8 liters of blood at one time. They mentioned that it was much more simple to practice immunization and hyperimmunization in one single procedure. Four liters of virulent blood and 25 c.c. of serum were injected. After fifteen days the blood serum of the animal was protective in a dose of 25 c.c. Eight liters could be injected instead of four and the blood was more active, but the activity was not in proportion to the dose of virus inoculated.

The same writers added three per cent of potassium citrate to the blood used for hyperimmunization and found it advantageously replaced the use of defibrinated blood.

Nicolle and Adil-Bey (5) introduced the use of peritoneal washings as a substitute for virulent blood. This procedure was favorably reported upon by Ruediger (6) who showed that it cut in half the item of cost for animals producing virulent blood. Further, he regarded the serum from animals injected with peritoneal washings as more potent than in the case where blood was used.

Kolle and Turner introduced into the literature of anti-rinderpest serum the idea of a prolonged passive immunity conferred by the injection of serum. Turner (3) concludes that 200 c.c. of serum will afford immunity for some two months or more. Kolle and Turner (7) gave five experiments as evidence that large doses of anti-rinderpest serum confer an immunity of many months' duration. Kolle (8) quite recently repeats the statement that 100 to 200 c.c. confers to healthy cattle a condition of immunity continuing for three months. The very limited work from which their conclusions were drawn is not such as to carry conviction and the conclusions have lately been severely criticised (18, 20). Nevertheless the ideas as to passive immunity advanced by these writers have been repeatedly reaffirmed without confirmation and have had a profound influence upon the methods of using anti-rinderpest serum.

The belief that anti-rinderpest serum confers a period of passive immunity was made by Stockman (9) the basis in the Trans-

vaal of a campaign against the disease in which the use of virulent blood was avoided.

Head (10) in writing of the serum alone method observed that the disease would break out again about three weeks after injection. He felt that the expense of reinjecting with serum was a serious matter, and further, under such conditions was not able to determine when the disease was ended on account of its smouldering among animals protected with serum.

Arloing (11) noted that the disease continued to take victims, disappear and reappear, during a period when repeated injections of serum alone were made.

In India the serum alone method as reported by Lingard (14) and by Walker (15) consisted of injecting animals with a protective dose of serum and immediately exposing them to natural infection. Such a use of serum is the same in effect as simultaneous inoculation and gives opportunity for obtaining the maximum possible beneficial effect from the serum. The present writer regards such use of serum as entirely in accordance with known facts.

The serum alone method in the Philippines was used with the idea that it would give a lengthy period of immunity. Jobling (12) places it at two to four months and Ruediger (13) states that the immunity persists two or three months. The writer arrived in the Philippines just at the close of the period when serum alone was used. The idea of the field men engaged in the work was that the serum should prevent attack during a period of several months. As a matter of fact, sickness and deaths even, occurred with disturbing frequency within two weeks after injection with serum. In conjunction with the use of serum, efforts were made to prevent infection by isolation and disinfection. Instances of belief held by certain individuals that the serum protected against attack were common enough. Men would point to the fact that certain animals in a locality where infection was prevalent, did not contract rinderpest after injection of serum was made. However, in these cases it was not possible to show that the animals were not already immune nor that they had actually been exposed to infection.

In this connection facts regarding the transmission of rinderpest are of great interest. The literature of this phase of the rinderpest problem contains scarce and contradictory references to the matter. Ruediger (16) in the Philippines had made the statement that pastures which have been infected by sick animals may remain infected for months or even for years.

The present writer (17) in cooperation with Wood and Boynton attacked the problem and drew the following conclusions:

"1. Rinderpest virus was not shown to have survived beyond twenty-four hours in corrals bare of vegetation but containing water. The conditions under which tests were made included all seasons of the year with accompanying variation in sunlight, rain, and condition of the soil. The amount of shade varied widely.

2. Animals became infected in such corrals within half an hour, twelve hours, and seventeen and one-half, respectively, after removal of the sick.

3. Animals infected with rinderpest were shown to be capable of transmitting the disease to susceptible animals by close contact only during the febrile period of the disease, and most certainly during the period in which the temperature was declining. The disease was not contracted by susceptible animals when exposed to sick animals during the convalescent stage when the temperature was nearly normal.

4. Blood of animals infected with rinderpest was shown in two cases to be infective during the height of the febrile period.

5. The virus in urine, diluted with water and sprinkled on grass, was demonstrated to survive for thirty-six hours, in some instances, but not always, and not for a longer period of time.

6. Feces mixed with water and sprinkled on grass infected an animal twenty-four hours later.

7. Feces and urine diluted with water and kept in a vessel in the shade remained infective for susceptible animals for thirty-six hours, but no longer.

8. No evidence was secured to show that recovered cases transmit the disease.

9. The foregoing facts indicate that the virus of rinderpest perishes soon after being discharged by the infected animal.

10. Nothing in the foregoing experiments indicates that rinderpest virus is harbored for long periods upon the soil of contaminated areas."

The above results drawn from a series of 26 experiments, many of them duplicated, emphatically contradict the idea that rinderpest virus remains alive for long periods outside the body. These conclusions along with clinical observations in the field, point to the danger of the unrecognized mild cases, of which there are many as a source of infection. Thus an isolated animal injected with serum stands a small chance of coming in contact with infection except indirectly through the attendant.

Struck with the discrepancy between the claims that serum alone induces a long period of immunity and the hard fact that it did not do so in the field, the writer (18) with Wood undertook

some tests of the matter. At the time no information was at hand to show that anyone had put to test the statements as to passive immunity made by Kolle and Turner and repeated by various authors. The results did not show that hyperimmune serum even in excessive doses, prevented infection. However, in cases where large doses were used, the severity of the attack was so modified that symptoms might not be discerned. Animals injected with serum and exposed to infection immediately contracted the disease nearly within the usual incubation period, and passed through an attack, the severity of which was in inverse proportion to the amount of serum used. The first rise of temperature was delayed, as compared with controls, a fact attributed to the effect of the serum. The results justified a severe criticism of the ideas of Kolle and Turner.

A comparative test was made of hyperimmune serum from animals that were naturally immune before hyperimmunizing and of serum of animals that were susceptible when first immunized. The results indicated that test animals injected with the product from serum herd animals originally susceptible experienced a shorter period of sickness than those with serum from immunes. Ruediger (19) concluded that serum from nonreactors was equal to or very nearly equal to that from animals that had actually contracted rinderpest from the injection of virulent blood. Gibson (21) observes that as a general statement, serum from animals that have recovered from a mild attack is more potent than that from an animal that has recovered from a severe attack. In practice the difference is negligible, for slight deficiency in potency may be compensated for in a larger dose.

While our work was in progress the work of Holmes (20) came to notice. He concluded that a protective dose of serum when injected remained so only for two weeks and even at that time its power was greatly diminished. Thus four out of nine animals died when inoculation of blood was delayed two weeks. Those tested at twenty-one and twenty-eight days all died. Increasing the dose extended the protective period somewhat. He also showed that an active immunity could be conferred to a susceptible animal by the injection of virulent blood together with an amount of serum sufficient to mask all signs of a reaction.

There is no question but that immense amounts of anti-rinder-

pest serum have been wasted by use under conditions where the animals were not immediately exposed to infection. It is believed, however, that most of this serum is now used in the simultaneous method as employed in Egypt and the Philippines or as serum alone under conditions very similar, as in India.

The cost of producing hyperimmune anti-rinderpest serum has even been a hindrance to its use on a scale proportionate to the needs, and further has led to the reduction of dosage to a dangerous point. This has brought the simultaneous method promptly into disrepute, for the first condition of its popularity among stock owners is that their animals shall not die. Turner (3) reported that the serum produced at the Kimberly station sold for \$36 a liter. The cost of production is not given, but presumably in a time of public calamity a government institution would not aim to make an excessive profit. Sample lots of serum from French Indo China and from Japan cost the Government of the Philippine Islands at the rate of \$24 and \$17 a liter respectively. It cost the Transvaal Government \$12.50 a liter, and the Government of the Philippine Islands \$12 a liter to prepare.

Practically the whole of the expense centers around the hyperimmunizing process. However, Gibson (21) seems to be the first writer who questioned the necessity of hyperimmunizing animals before drawing blood for preparing anti-rinderpest serum. He stated that he had abandoned hyperimmunization on the ground that an animal that would tolerate 150 c.c. would tolerate indefinitely large amounts. He regarded the additional reaction obtained by huge doses as just as likely due to the resentment of the organism to the foreign material, as to the virus itself. He felt that it was a great advantage to the veterinary officer in an outlying district to have an inexhaustible supply of immune defibrinated blood, and be quite independent of a serum laboratory.

Shealy (22) also made a similar observation to the effect that just as good results could be obtained with serum prepared from animals after recovery from an attack as when the animals had been hyperimmunized.

The present writer (23) and Wood were impressed by the necessity of having cheaper serum for use by the simultaneous method and undertook field trials of serum from animals that had merely been immunized in the field and not hyperimmunized.

Our previous experience (18) had emphasized the fact of the ease of controlling the severity of the attack by increasing the dose. Thus, we felt that even if immune serum were appreciably less potent we could easily compensate therefor. Further, Wood had noticed as had Gibson and Shealy, that good results could be obtained from the use of nonhyperimmune serum.

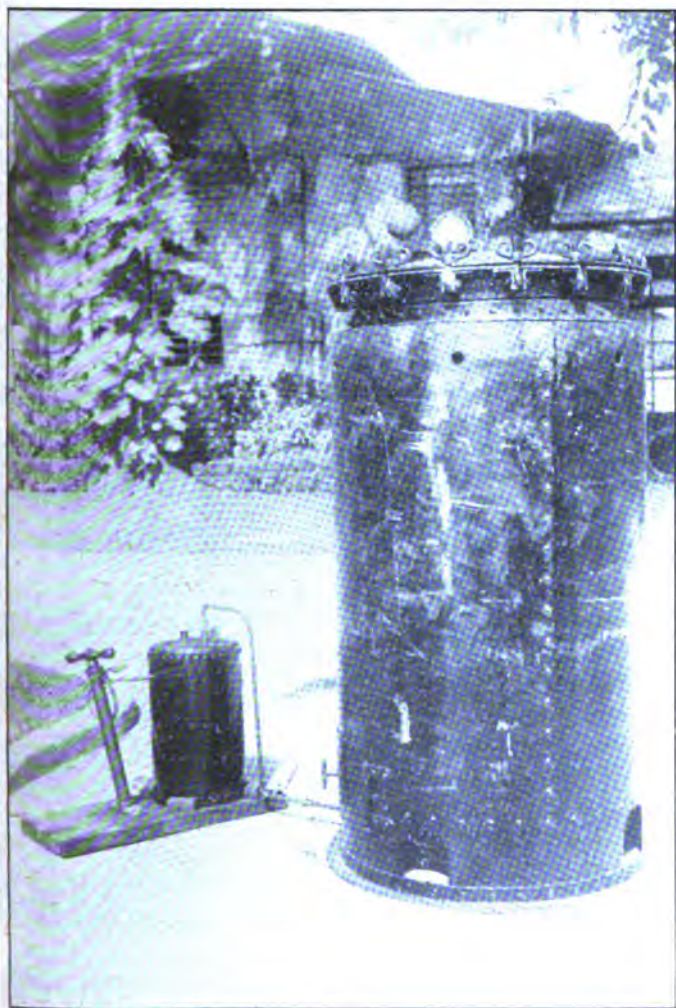


FIG. 1. Autoclave with gasoline heating apparatus used in field serum laboratory. Photograph by Bureau of Agriculture, Manila.

The first 141 animals immunized received hyperimmune serum, but subsequently only serum from the animals immunized in the field was used. It was found practicable in the field to use apparatus for collection of serum in such manner that abscesses did not result from its use. To do this in a tropical country under camp conditions and with native assistants I consider to be a notable achievement of the men in direct contact with the work. Figs. 1 to 3 give an idea of how the work was carried on. It seemed preferable to use serum rather than defibrinated blood, for by eliminating the blood cells we thereby reduce the amount of inert material injected. At the end of the immunizing reaction blood to the amount of three liters was drawn from a large percentage of the animals without reference to how strongly they had reacted. Each lot of animals was detained about a month for immunization and blood drawing.

The death rate tabulated for one lot of 429 animals was 1.4 percent; for another group of 1657, was 1.3 per cent. Subsequent to my leaving the Philippines the method was applied to 1900 imported animals with all the disadvantages of their having experienced a trying sea voyage, with a loss of .63 per cent.

In the first few injections we used 200 c.c. on a small lot with a loss of 25 per cent, and 300 c.c. in another lot with a loss of 10 per cent. Consequently we decided upon a dose of 350 c.c. per buffalo (carabao) as they ran, without making nice distinctions as to weight, which probably varied from 600 to 1000 pounds. This would be a dose varying from 35 to 53 c.c. per hundred pounds. We had previously noted that a dose of 48 c.c. of hyperimmune serum per 100 pounds was necessary to protect the most susceptible cattle in the Philippines.

Aside from the small death rate, the immunized animals made prompt recoveries. The result upon the general health of the animals was entirely satisfactory to the owners. Subsequent to the work herein reported, this system of immunization with the voluntary consent of the owners has been extended to other parts of the Islands such as the Province of Pampanga and the importation quarantine station at Ilo Ilo. The funds at the disposal of the Bureau of Agriculture have not been sufficient to meet the demand for the work.

At the outset, the work was conducted cautiously with little consideration of overhead charges. However, when it was in full swing with the time of the men profitably occupied the cost to the Government was 33 cents apiece for 1,056 animals injected in one month. Had hyperimmune serum been employed the cost would have been \$4 per animal for the one item of serum. No expense was incurred for virulent blood, this being obtained from animals at the height of the immunizing reaction.



FIG. 2. Method of drawing blood with vacuum apparatus at field serum laboratory. Photograph by Bureau of Agriculture, Manila.

The effect of an insufficient dose of serum was illustrated by an experience on a large sugar plantation where immunization was undertaken during the existence of an outbreak of rinderpest among hard worked, rundown cattle. One lot of 35 animals received only 100 c.c. of serum due to a misunderstanding of instructions by the operator, and 34 per cent of them died. The dose was raised to 300 c.c. of serum and of one lot of 30 animals 2 died of causes not attributable to the immunization reaction. Another lot of 30 receiving 300 c.c. of serum, lost 4 animals.

While our work was in progress Holmes' (14) publication on the same general subject appeared. He concludes that the serum obtained after natural recovery or after an immunizing reaction is little inferior in potency to that taken after the process of hyperimmunization. Some variations as to effect of hyperimmunizing were noted among the various classes of animals experimented upon. The serum of cattle of the plains of India could not be improved upon by hyperimmunizing with virulent blood of the same class of cattle. The serum of buffaloes could be made twice as potent by hyperimmunizing with virulent blood from buffaloes. This was the greatest improvement found to result from hyperimmunizing. Thus doubling the dose of serum of nonhyperimmune buffaloes would compensate for omitting hyperimmunization.

Holmes further pointed out that virulent blood from an animal being immunized by virus and serum could be employed in hyperimmunizing. Thus an animal may serve to produce virulent blood for hyperimmunization and after recovery from the reaction be bled for serum, after which it may be hyperimmunized, and more blood drawn for serum. The lowering of potency incurred by drawing blood may then be corrected by injecting more virulent blood. The economy effected has permitted doubling the output of the laboratory without any additional expenditure.

Thus the idea of the greatly superior quality of serum from hyperimmune animals that has dominated the thought and practice of workers on anti-rinderpest serum since the work of Kolle and Turner in 1897 must be abandoned. In the field of work of immunizing in the Philippines we reverted to the methods employed in South Africa before hyperimmunization had ever been suggested.

The idea of obtaining a great concentration of immune bodies per unit volume by hyperimmunizing has led workers on rinderpest into using complicated, expensive processes without adequate return therefor. The phrase "impotent serum" seems to have designated that which fell below a certain concentration per unit volume (arbitrarily designated), that which in dose of a given number of cubic centimeters per hundred pounds of animal would not protect against a given amount of virulent blood and which serum therefore was worth less in price than potent serum. Incidentally, the standard of one or two c.c. of virulent blood, against

which varying doses of serum are tested is certainly not the definite unit that is constituted by a given quantity of bacterial culture toxin. It is by no means clear that varying this factor within wide limits, makes any difference. Impotent serum seems to have been that which would have been valuable if the quality had been expressed in terms of so many cubic centimeters as a protective dose per animal. An impotent serum seems to have been that which was used in a dose too small to protect.

The idea of Kolle and Turner in using gradually increasing doses of disease producing blood seems to have been to parallel the practice of injecting toxin, as in immunizing horses against



FIG. 3. Field serum laboratory.
Photograph by Bureau of Agriculture, Manila

tetanus and diphtheria. There is no true parallel between the procedures of making antisera for tetanus and for rinderpest. In the former case the toxin is elaborated in cultures in the laboratory and is available in greater amount than would be elaborated in the tissues of the animal sick of the disease. Also, its introduction into the body may be controlled when a horse is being artificially immunized.

In the preparation of anti-rinderpest serum the phenomena are quite different. It was soon found that a single injection of a large amount of virulent blood gave results in hyperimmunizing

equal to that afforded by gradually increasing doses. Thus, within certain limits at least, there were no serious toxic results in rinderpest as would have followed the injection of a bacterial culture toxin. Later experience has shown that the injection of 1 c.c. of virulent blood will set up an attack during which antibodies are developed to such a degree that the blood in such case is little inferior to that from a hyperimmunized animal.

What really is in virulent blood used for hyperimmunization and what these constituents accomplish has not been worked out. The virus, of which we know little, is there. At the height of an attack, immune bodies whether or not in maximum potency must be present. Thus while injecting virus in virulent blood we are also injecting antibodies. Is there a toxin present in the virulent blood of a sick animal but not comparable in concentration to a culture toxin? Likely, for rinderpest manifests itself in a susceptible animal as a toxemia. No toxin has been prepared and studied in rinderpest in the sense that tetanus and diphtheria toxins are known. Is the toxic element in virulent blood bound to the antibodies?

What constituent in virulent blood is active in producing hyperimmunization in those cases where this process produces a measurable result? Will the virus organisms multiply in the blood of an immune animal, or will they stimulate antibody formation without growth? Is there a relatively weak toxin which stimulates antibody formation? What of the antibodies in the virulent blood? In massive injections they constitute a recognizable factor. At any rate, the results of the injection of virulent blood as a whole, have been over-estimated and therefore none of the factors is of as great importance as formerly supposed.

Whether hyperimmunizing is worth while or not it seems, should depend upon the cost of caring for the animal during the extra time necessary to produce hyperimmune serum and upon the increase in potency accomplished. Religious or other scruples of the natives of India against the drawing of blood in the field may make it necessary to produce serum at a central laboratory; in the Philippines none such exist.

Likewise is discredited the exaggerated idea of the period during which a protective dose of serum alone remains effective. Every day that elapses before exposure to infection results in a dimi-

nation of the protective property that was introduced by the serum. In no case is a susceptible animal, when exposed to infection, protected from invasion of virus and an attack of some degree of severity.

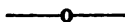
Consideration of ideas held concerning anti-rinderpest serum furnishes subject for reflection in connection with hog cholera and suggests a number of inquiries concerning the use of serum in the latter disease.

What is the potency of hyperimmune anti-hog cholera serum as compared with the non-hyperimmune serum drawn just after immunization? Could immunization in hog cholera be induced by one single injection of the hyperimmunizing dose, with a protective dose of serum as done by Nicolle in rinderpest? If so, what is the minimum amount of virulent blood necessary?

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LYMPHOSARCOMA OF THE FOWL

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HISTORICAL: Only one authentic case of lymphosarcoma of the domestic fowl* has been recorded in the literature at hand from the library of this institution. This case was found in the heart of a fowl. The heart appeared about normal size. The sectioned surface showed small, roundish, clear areas, which upon microscopic study proved to be a lymphosarcoma.

A sarcoma is a connective tissue tumor whose elements, either because of their number or often because of their size, predominate over the intercellular substance.†

Sarcomata develop either in previously normal tissue belonging to the connective tissue group, as the skin, subcutaneous tissue, intermuscular connective tissue, peritoneum, spinal cord, meninges, or connective tissue of glands.

Sarcomata may also develop in some pre-existing connective tis-

*Poultry Diseases and Their Treatment, Page 138—Kaupp, *Am. Jr. Vet. Med.*, 1914.

†General Pathology, page 419—Ziegler—William Wood & Co., New York.

sue tumor as a fibroma, myoma, chondroma, and hypertrophic lymphangioma.

The transformation of the parent tissue into tumor tissue takes place through the growth and multiplication of the existing cells. This cell division takes place principally by the process of mitosis, and the mitoses are the more abundant the more rapid the growth of the tumor. In addition to typical mitosis there are frequently observed atypical forms, also nuclear fragmentation or karyorrhexis, and more rarely segmentation.

A sarcoma in its well developed state forms a more or less sharply circumscribed new growth. These tumors may appear in any part of the body where connective tissue is present. There are some tissues in which the sarcoma appears more abundant than in others, these are the skin, fascia, intermuscular connective tissue, bone marrow, liver, intestines and lungs.

The sarcoma when sectioned appears soft to the touch, cuts easily and is easily torn. Microscopically the neoplasm appears more like the developing connective tissue of the embryo or the granulation tissue of inflammation.† The cells of the sarcomas are of various shapes and sizes. They may be fusiform, branched, spheroidal or flat, and at times cuboidal or even cylindrical. They may be very large and possess more than one nucleus or they may be very small and spheroidal in shape and possess but one nucleus. They may somewhat resemble a lymphocyte. The abundance of cells may so cover over the basement substance that it may entirely escape superficial observation. Again it may be so abundant as to give the section the appearance of a fibroma. The cells may be intimately intermingled with fascicules, or, they may be in large open-meshed networks, giving to the tumor the alveolar appearance. The cells always stand in relation to the basement substance, which they sometimes reveal by fibrillar processes continuous with it. These tumors are also richly supplied with blood vessels, and in fact, form an important structural element.

Sarcomas are malignant tumors. They may occur rather early in the life of the animal. As stated before, they are cellular in character, grow very rapidly, are quite vascular and hence succulent and are marked with their tendency to recur when excised. They

†A text book of Pathology, page 348—Delafield and Prudden—Wm. Wood & Co., New York.

spread both by contiguity of tissue and by metastases. Occasionally a sarcoma takes on a slow growth, under which conditions they are rather dense and, in fact, may remain localized and remain harmless for several years.

The sarcomas by their intimate relations with the blood vessels and also lymphatic structures are prone to spread by metastases especially by way of the blood currents. The richly cellular and vascular sarcomas are prone to hemorrhages, degeneration, and ulceration.

Each tumor is usually made up of just one kind of embryonic cells. In many cases, however, the cell form varies greatly in the growth.

There is a tendency to reproduce in these tumors some of the special characteristics of the tissues in which they originate. Thus, sarcomata of the bone are likely to be osteo-sarcomata; those of the choroid are likely to be pigmented sarcomata; of the brain, gliosarcomata; in fatty tissue, lipo-sarcomata; in cartilage, chondrosarcomata; in gland tissue, adeno-sarcomata; in muscle, myo-sarcomata; in the dura mater, fibro-sarcomata; with lymph structures, lympho-sarcomata; containing giant cells, giant-celled sarcomata; where blood vessels predominate are called angio-sarcomata; with mucoid tissue, myxo-sarcomata; and in muscular structure and containing muscle cells mixed with it, myo-sarcomata; where the cells are held in nests the framework being connective tissue the tumors are called alveolar sarcomata.

In regard to the type of cells, in a simple or in a complex sarcoma, there may be the following: small or large round cells, small or large spindle cells. These four types of cells are the predominating factor in the sarcomata.

The small round cells, of the small round celled sarcoma, are about the size of the small lymphocyte and resemble that type of cell very much. This cell type of sarcomata is usually very malignant. They most frequently occur in the connective tissue of the muscles and fascia, in bone, and in lymph nodes or along the line of lymphatics. In the fowl they most often occur in the intestinal tract and other parts of the abdominal viscera.

The large celled variety possess cells that are very much larger than the last named variety. Their nuclei are large in proportion to the size of the cell and contain prominent nucleoli. They are usually less soft and malignant than the small celled variety.

As stated before there may be retrogressive changes in the sarcomata. These degenerative changes may be fatty degeneration, mucous degeneration, liquefaction, caseation, necrosis, hemorrhage, ulceration and even gangrene.

When the embryonic celled tumor shows a more or less even distribution of the cells without the formation of distinct grouping, it is spoken of as a simple sarcoma.|| Those sarcomata which show a special arrangement and grouping of the individual cells, so that the tumor formation arises which are very similar to the epithelial tumors are of the second class. When secondary changes appear in the cells, in the intercellular substance, and in the blood vessels, giving the tumor a characteristic appearance it is considered a sarcoma of the third class.

The etiology of sarcomata is only partly understood. In mammalian species they occur more often in youth than in old age. As yet too little data are at hand to make a definite statement about birds. It has been found that some sarcomata even commence development in embryonic life, and the origin has been charged up to some local malformation. Very often traumata appear to be an exciting cause. A parasitic origin has been demonstrated. (Ziegler).

In the formation of sarcomata usually one primary tumor is formed and from this multiple tumors result by metastases. However multiple primary sarcomata may occur. This may particularly be the case in the bone-marrow and skin.

Sarcomata are prone to irregular growths and are usually not encapsulated. They grow by contiguity of tissue, by sending irregular extensions out into the adjacent tissue, thus becoming larger without being definitely circumscribed.

As in mammalian species, so in the domestic fowls, the sarcomata may be transplanted. Rous and Murphy experimented with sarcomata from three different sources. The first was a simple spindle celled sarcoma, the second was an osteochondrosarcoma and third a spindle celled sarcoma curiously fissured with blood sinuses and showing a tendency to metastasize to the skeletal muscles. All specimens were originally obtained from the domestic fowl. In their summary they conclude as follows:

[Ziegler's General Pathology, 1908, Wm. Wood & Co., New York.

"The phenomena of natural and acquired resistance to transplanted chicken tumors strikingly resembles those observed in the case of transplanted mammalian growths; and no more than those do they suggest that the tumors have an extrinsic cause. §

"That there may exist in fowls implanted with chicken tumor a resistance directed against the tumor-causing agent distinct from the resistance manifested against the alien tumor cells has been shown. Both sorts of resistance are present in a fowl in which a tumor has retrograded, the resistance in such an instance being acquired. That directed against the agent is largely specific, giving little if any protection against the agents causing other tumors. There is some evidence that the conditions upon which a fowl's natural resistance depends are the same for the agents causing different chicken tumors."

"It has proved impossible to protect chickens against the agents causing the simple sarcoma by injecting them with dried tumor material in which this agent has been attenuated by heat. The transfer of blood from resistant fowls with growing tumors is in our experience void of effect on the tumors."

One case of lympho-sarcoma has recently been studied in this laboratory which appears to us to be worthy of record. The following is the record:

CLINICAL HISTORY: A single comb Rhode Island Red hen two years of age and a member of the farm flock at Iredell Test Farm.

This hen had appeared in excellent condition, except for a slight diarrhea, up to about ten days before she was sent to the laboratory. She had a loss of appetite, diarrhea, and was thin in flesh. The comb and wattles and facial regions were pale and the plumage in a rather unkempt condition.

The hen was placed in the death chamber and killed by the aid of illuminating gas.

AUTOPSY PROTOCOL: The bird was of medium size, thin in flesh and other external conditions were as given under clinical history.

Upon opening the abdominal and thoracic cavities the thoracic organs were found in a normal condition. An examination of the abdominal cavity showed almost a total absence of the retroperitoneal fat, which is usually so common especially in hens two years

or more of age. The liver was rather under size and a darkish red in color, weighing only 25 grams. The spleen was normal in size and color. There was noted just anterior to the cloaca and involving the whole rectal wall, a tumor measuring 7.5 x 7.5 x 4 cm. Upon opening this tumor it was found that it involved the entire rectal wall giving passage to that viscus through its middle. The sectioned surface of the tumor wall was 1.5 cm. in diameter. There

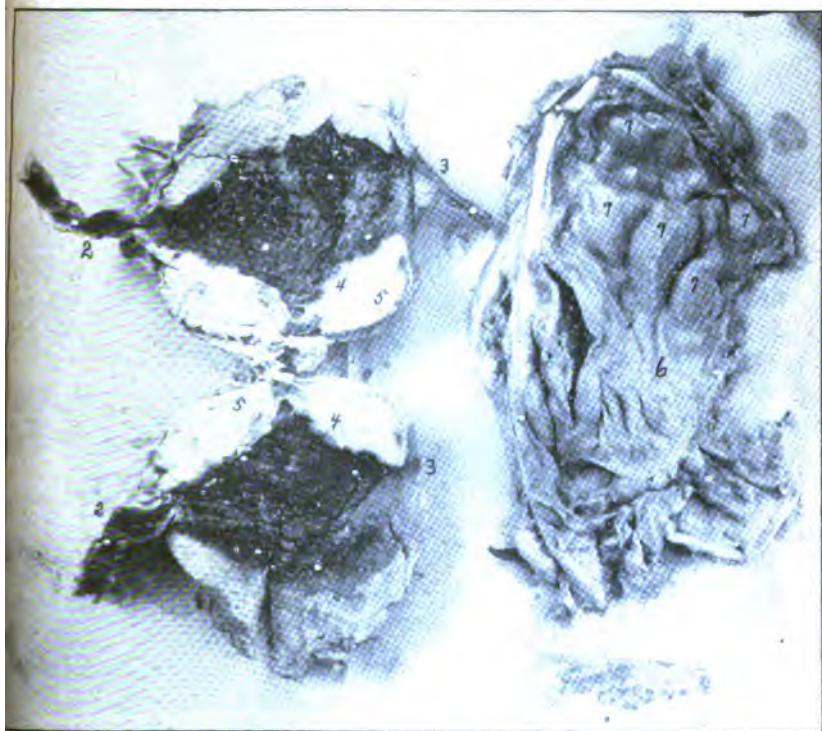


FIG. 1. Lympho-sarcoma. Tumor of rectum and mesentery.

1. Lumen of large intestine inside of tumor.
2. Uninvolved portion of rectum.
3. A portion of the cloacal mucous membrane.
4. Caseation necrosis.
5. Lympho-sarcomatous elements.
6. The mesentery.
7. Five of the tumors.

was an ulceration of the lumen of the intestine, a mass of necrotic tissue appearing suspended from the wall of the cavity. The cavity was fusiform in shape, measuring 1 x 3 cm. in the widest place.

Anterior to this point and involving the intestinal wall were two other neoplasms which measured $2 \times 1 \times 1$ cm.

At the anterior point of the right kidney and overlying the adrenal gland was a fourth tumor measuring $3 \times 3.5 \times 4$ cm. The sectioned surface revealed a solid though soft whitish structure.

In the mesentery of the free portion of the small intestines there were found ten small, rather flat whitish-yellow appearing tumors. They varied somewhat in shape but the majority will fall within the limits of the following measurements which represent the size of two: $5 \times 8 \times 2$ cm., $5 \times 6 \times 1$ cm.

The ovary was in an inactive state. The gizzard, pancreas and proventriculus were normal in appearance.

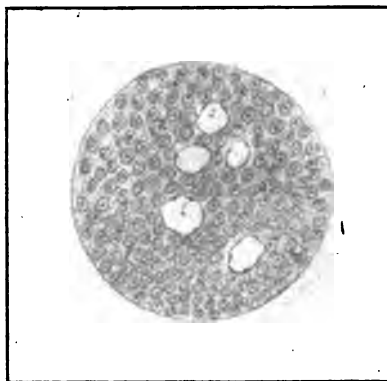


FIG. 2. Lympho-sarcoma of the fowl.
1. Lymph vessels.
2. Sarcoma cells.

MICROSCOPIC EXAMINATION: The Mesenteric Neoplasms were placed in a ten per cent solution of formaldehyde for 48 hours, then passed through absolute alcohol and then through ether and alcohol and imbedded in celloidin, blocked, sectioned and stained with hematoxylin and eosin and clarified in cedar oil, for study.

The section was packed with small round cells with large nuclei. The cell type appeared to be that of the embryonic variety. Each nucleus contained one or more deeply staining metachromatic granules and many showed distinct nucleoli. These granules were rather small. Here and there was to be noted nuclear fragmentation indicating karyorrhexis. The ground substance appeared to be rather granular and homogeneous and in places rather stri-

ated though no nuclei or cells could be observed except those possessing the large round nuclei of an embryonic type. Numerous blood vessels were observed; these vessels were filled with blood cells and were thin walled. There is no clearly defined limitation of the invasion of the sarcomatous cells into the surrounding tissue. Numerous small vessels, not blood vessels, but containing only an endothelial lining were observed.

A section was made from the WALL OF THE TUMOR, involving the large intestine just anterior to the cloaca. On the inner portion there was a layer of necrosing and disintegrating cellular material which may be regarded as caseation necrosis. Under this layer could be recognized a layer densely infiltrated with polymorphonuclear leucocytes mingled with the same small embryonic type cells that were observed in the other tumor sections. The outer layer consisted of densely packed round cells with large nuclei containing one or more small, deeply staining metachromatic granules. The ground substance, in areas where it was observable, was noted to be of a homogenous nature as in the preceding slide. There were a few thin walled blood vessels, most of which were filled with blood cells. There were areas containing numerous small vessels with a single endothelial lining—the lymph vessels.

Sections of the neoplasm from the anterior portion of the kidney and the mesenteric tumors were of the same structure except that these showed no necrosis or polymorphonuclear invasion.

Figure No. 1 shows a photograph of the gross specimen and Figure No. 2 is a drawing through a portion of the more densely packed part. The cells do not show so densely, in order that the outline and details may be shown. There will also be seen some of the typical lymphatic vessels.

The mesentery of the fowl does not contain mesenteric lymph glands as do those of the mammalian class but there are many lymphatic vessels which pass upward from the numerous villi and there is also found lymphoid tissue in the mucous lining of the intestinal tract.

CORRECTION. In the Proceedings published in the May number, page 290, it was erroneously stated that Dr. E. E. Patterson of Detroit, Mich. was a graduate of the Detroit Veterinary College, 1901. It should have been Grand Rapids Veterinary College, 1901.

NOTES ON THE OCCURENCE OF PETECHIAL HEM- MORHAGES IN THE LARYNX AND KIDNEYS IN HOG CHOLERA

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For some reason petechial hemorrhages on the mucous membrane of the larynx have received little mention in most accounts of post-mortem lesions found in hog cholera. In the recently published report of the Committee on Diseases, of the American Veterinary Medical Association, on various phases of hog cholera, in the section dealing with post-mortem lesions, no reference whatever was made to these petechial hemorrhages. These appear to form a fairly constant lesion in hog cholera, and do not materially differ from the hemorrhages found in other mucous membranes and in the serous membranes.

We know of no other disease of hogs in which this lesion appears, although hemorrhagic laryngitis is a fairly constant lesion found in hemorrhagic septicemia of cattle. Wherever these hemorrhages are found, it is customary to attribute them to the specific nature of certain diseases. The question arises as to whether these hemorrhagic lesions can be positively attributed to the action of the specific virus of hog cholera or whether we should attribute them to some secondary invaders, which are so common in this disease. In view of the fact that the hemorrhagic lesions found in other organs are practically always mentioned, we can see no reason why the same lesions in the larynx should be overlooked.

The question as to the specificity of the hemorrhages in the kidneys might well be considered in this discussion. In the accounts of the pathogenicity of the old hog cholera organism, *Bacillus cholerae suis*, hemorrhages in the kidneys are said to have been produced by this organism. At least one other organism besides the hog cholera virus and the *Bacillus cholerae suis*, undoubtedly produce lesions of a similar character in certain cases, namely, the *Bacillus necrophorus*.

The writer takes this opportunity to note the fact that petechial hemorrhages have been observed in the kidneys of fetuses found in some pregnant sows that have been inoculated for the pro-

duction of hog cholera virus. This would seem to indicate that if the virus is directly responsible for these hemorrhages, it is small enough to pass through the placental filter. This has been noted in at least two cases, and it is of further interest to relate that in one case no clearly defined hemorrhages could be detected on the kidneys of the sow, but quite a number of them could be seen quite distinctly in the kidneys of the fetus. In the latter case there was no doubt as to the presence of cholera, as most of the other lesions usually found were in evidence, and the sow in question had shown undoubted clinical symptoms of the disease before slaughter.

Petechial hemorrhages in the kidneys undoubtedly occur in a number of pathological conditions in which the kidneys are involved, either directly or indirectly. Post-mortem examinations of hogs, supposed to be immune to cholera, in a number of instances have revealed hemorrhages in the kidneys. Some of these hogs were healthy at time of slaughter, while others had died from some one of several conditions. A number of so-called "hairless" pigs, less than forty-eight hours old, recently examined by the author, showed the kidneys to be almost covered with minute hemorrhages. We may be accused of taking too free license with the term hemorrhage, but microscopical examinations usually reveal such to be the case.

The only references to hemorrhages in the larynx that can be found by a search of current literature include a brief mention by Huttyra and Marek² as follows:

"In the pharynx, at the base and on the border of the tongue, sometimes also in other parts of the buccal cavity, and in the larynx, hemorrhagic inflammations of the mucous membrane, with croupous pseudo-membranes and ulcerations, together with a superficial or deep necrosis may very frequently be found."

Also the following from a paper by Dinwoodie⁴, read before the Minnesota State Veterinary Medical Association about two years ago:

"The larynx and trachea in many cases will be covered with a stringy, frothy, adherent, oftentimes blood-tinged and foul smelling mucus. Upon removal the mucous surface is dirty white in color and lustreless. The mucous membranes of the larynx may be thickened and folded, and showing beneath are oftentimes hemorrhages, irregular in outline, number and size. The bronchi may be similarly affected."

In reporting in the same paper upon the lesions found in 350 cases of hog cholera Dinwoodie does not give any data as to the frequency of lesions in the larynx.

These petechial hemorrhages, from a histological standpoint, are possibly the result of some lytic action of the hog cholera virus upon the endothelial cells of the capillaris, or the same effect may result from the combined lytic action of the virus and bacterial



FIG. 1. Larynx of hog showing numerous petechial hemorrhages on the mucous membrane of the arytenoid cartilages.

emboli becoming lodged in the finer blood vessels of the tissues when we so frequently find these hemorrhages. Hutyra and Marek³ make the following mention in this respect:

"According to the histological examinations of Marek, the hemorrhages develop either as a result of bacterial emboli or as a result of a toxic affection of the walls of the blood vessels (the latter especially in the kidneys)."

The hemorrhages in the larynx are usually seen best when a highly virulent strain of virus is being used and the inoculated animals are killed or allowed to die along about the eighth to the twelfth day. The appearance and location of these hemorrhages in different animals does not differ materially, although there is evidence to suggest that they may be transient. This statement is made because of the variations in color, sometimes noted. In some cases the color is a very distinct red, whereas in others, usually in those pigs which have lived a few days longer, this bright red becomes dull, and has a sort of faded or rusty appearance. In some cases only a few hemorrhages will be seen, while in others they will be quite numerous. The majority of the hemorrhages are usually seen in the mucous membrane covering the arytenoid cartilages, but in a few cases hemorrhages are seen on the mucous membrane of the other cartilages, particularly the epiglottis. As a rule the amount of hemorrhage is fairly well divided between the lateral halves of the larynx. The larynx illustrated in Figure 1, was a very pretty specimen and shows a rather extreme case of the hemorrhagic laryngitis herein described.

The lesions found in the larynx in 500 consecutive autopsies show the following:

Hemorrhages	Cases	Per Cent
None	123	24.6
Slight	227	45.4
Moderate	140	28.0
Extreme	10	2.0
	500	100.0

It will be seen that of these 500 cases, hemorrhages in the mucous membranes of the larynx were found in 377 cases, slightly over 75%. These 500 pigs were killed in from five to twenty days after inoculation.

Days following inoculation when killed	Percentage of the 500 pigs killed by days	Percentage of the pigs showing lesions, by days
5-6 inc.	5.4	59.2
7	18.8	67.0
8	21.6	80.4
9	21.8	82.6
10	14.	80.0
11	3.8	78.9
12-20 inc.	4.6	23.3

From the above table it will be seen that the majority of the 500 pigs were killed along about the seventh to tenth days. The table also shows that there is a time (8th, 9th, 10th and 11th days) when these lesions are most frequently found, there being a gradual increase in the percentage of pigs showing lesions up to the 9th day after which there is a gradual decrease. Slight lesions appeared to be more numerous in those pigs killed on the 7th and 8th days. Moderate lesions appeared most frequently in pigs killed on the 9th, 10th and 11th days, whereas no extreme lesions were found excepting in pigs killed on the 9th, 10th and 11th days after inoculation. see the table following:

Days after inoculation when killed	% showing slight lesions	% showing moderate lesions	% showing extreme lesions
7	71.4	28.6	0.0
8	63.8	36.2	0.0
9	54.4	41.1	4.5
10	53.6	44.6	1.8
11	40.0	46.6	13.4
12	50.0	50.0	0.0

A limited number of autopsies have been conducted on hogs dead of cholera following infection in a natural way. Hemorrhages in the laryngeal mucous membrane have been noted in about the same proportion as in the case of artificially infected cases.

ACKNOWLEDGMENT. The author desires to give credit to Drs. J. T. E. Dinwoodie and H. C. H. Kernkamp, both of whom have been associated with him during the time that these observations were made, for performing a large number of the autopsies and recording the lesions found.

CONCLUSIONS. 1. If we are to continue classifying hog cholera in the group of septicemic diseases, and accept the hemorrhagic

lesions found in the kidneys, lymph-nodes, intestines, bladder, lungs, etc., as a part of the pathological picture of this disease, the hemorrhages found in the mucous membrane of the larynx should also be considered along with the other lesions mentioned.

2. Hemorrhagic laryngitis has been found in about three-fourths of a series of 500 pigs, killed subsequent to inoculation with hog cholera virus, these hemorrhagic lesions being in evidence most regularly in those animals killed and autopsied eight to eleven days after inoculation.

3. In view of the fact that petechial hemorrhages in the kidneys occur in a number of different pathological conditions, veterinarians should be cautious about basing a diagnosis on this lesion alone, even though this lesion does appear in a very large percentage of cases of hog cholera, due to the filterable virus.

1. DIMOCK, W. W. *Journal of the American Veterinary Medical Association*, Vol. XLVIII (New Series Vol. I) No. 2, pp. 213-224.
2. HUTYRA AND MAREK. *Pathology and Therapeutics of the Diseases of Domestic Animals*, Vol. 1. p. 272.
3. *Ibid*, Vol. 1, p. 132.
4. DINWOODIE, J. T. E. Hog Cholera Lesions and Their Significance. *Proc. Minnesota State Veterinary Medical Association* (1914), Vol 1, pp. 37-49.



SOME ASPECTS OF THE PHYSIOLOGY OF MILK SECRETION*

—

A brief survey of the theories and scientific investigations upon this subject and an account of the recent experiments upon the increase of secretion of milk due to the injections of animal extracts (Pituitrine).

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REUBEN L. HILL, Ithaca, N. Y.

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INTRODUCTION. Probably no single subject in the whole domain of physiology has attracted more attention, both in ancient and modern times, than the mechanism underlying the secretion of milk by the mammary gland. Since the advent of the hormone doctrine by Bayliss and Starling in recent years many important contributions have been made to our knowledge of this subject particularly with regard to the relationships existing between the mammary gland and the organs of internal secretion. This article

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is a brief, but not exhaustive, summary of earlier experimental work, and a short account of the investigations undertaken with the object of determining the effect on the milk secretion of the injection of substances present in the hypophysis cerebri or pituitary body.

HISTORICAL. EARLIER VIEWS. Prior to 1800 A.D., few if any theories of mammary secretions are on record.

M. Richerand¹ 1817 believed that milk was derived from the lymph, while others of his contemporaries believed it to be derived from chyle.

M. Raspail (1833)² held the view that the mammary glands have some media of communication with the surface of the stomach "and that they extracted from the alimentary material the salts and organized material which enter into the composition of the milk."

M. Gerod (1839)³ of Lyons held that "there was an apparatus of vesicles intermediate between the uterus and the mammae, which continue inactive except during gestation and for sometime after delivery when they are excited to activity".

That the composition of the milk was also little understood by these authors is shown by the following quotations: "Casein, the nitrogenized constituent of milk is distinguished from albumen and fibrin by its greater solubility and by not coagulating when heated." This is regarded by Liebig⁴ as the chief constituent of mother's blood. To convert casein into blood no foreign substance is required; and in the conversion of a mother's blood into casein no elements of the constituents of blood have been separated out.

M. Raspail (1833)² defines milk to be an aqueous fluid holding albumen and oil in solution by means of an alkali or alkaline salt, which he suggests may be acetate of ammonia; and in suspension an immense number of albuminous and oleaginous globules."

NORMAL STRUCTURE AND DEVELOPMENT OF THE MAMMARY GLAND. In order that the various theories put forward from time to time to account for the secretion of milk may be better understood it may be well, at this stage, to give a brief description of the structure of the mammary gland.

The mammary glands are composed of a number of lobes which are further divided into lobules. The lobes are composed of convoluted ducts bound together by connective tissue.

These ducts are seen to arise from groups of secretory alveoli.

When traced forward they are found to unite forming the lactiferous ducts, in the human subject about fifteen or twenty in number, which at their points of origin are provided with reservoirs in which the milk collects during lactation. These lactiferous ducts open to the exterior by minute apertures through the teat. In the cow the lactiferous ducts empty into the milk cisterns or galactafor sinuses, which communicate with the exterior through the teat.

The duct walls consist of areolar tissue which contain some non-striated muscle fibers and are lined internally by columnar epithelial cells. These epithelial cells become flattened in the proximity of the nipple.

The secretion of the milk is a feminine characteristic, nevertheless at birth the mammary glands of male and female are very similar and in both sexes there is frequently an enlargement of the glands and an actual secretion of a fluid called "witch milk," during the first few days after birth.

This state of activity disappears after the end of the first or second week. The glands of both sexes remain in this undeveloped state until puberty when those of the female undergo a sudden growth accompanying ovarian functional activity while those of the male remain infantile or atrophy.

The growth of the glands of the female at puberty is largely controlled by the ovaries. If these organs are removed before puberty, the development of the mammary gland, as well as the other secondary sexual characteristics, is repressed.

The hypertrophy at puberty is largely due to an increase in adipose and connective tissue and not to the formation of secretory acini or true glandular tissue.

Unless pregnancy ensues there is no more growth in the mammary glands except a slight hypertrophy which appears at each menstrual cycle. These changes in the human mammae are very slight but in some animals and especially the marsupials, according to J. P. Hill⁵, the amount of growth at each ovulation period is so marked as to render it difficult to distinguish such animals from pregnant ones.

The growth of the mammary glands in the early stages of pregnancy is comparatively slow but it gradually increases in rate and towards the latter part is very rapid. This hypertrophy is due largely to the formation of true glandular tissue and secretory acini.

RECENT THEORIES OF MAMMARY GROWTH. To determine the factors which influence mammary growth during pregnancy has been the object of much research along varied lines. It was formerly supposed that there was a nervous connection between the uterus containing the developing embryo and the mammary gland; that during pregnancy the growth of the mammary gland was stimulated from the uterus, fetus and ovaries reflexly through the central nervous system. This view has been adequately disproven by several authorities.

Goltz⁶ and Ewald completely exsected the lumbo-sacral part of the spinal cord in a pregnant bitch thus severing all possible nervous connection between the pelvic organs and the mammary glands, which continued to develop as usual, and after parturition the bitch was able to suckle one of the puppies.

Ribbert⁷ transplanted the mammary gland of a guinea pig to a position near one of the ears. During a subsequent pregnancy, the gland enlarged and after parturition secreted milk even though it was severed from all possible nervous connection.

Pfister⁸ has successfully performed a similar operation upon a rabbit with like results.

Knauer⁹ has shown that both ovaries can be removed thus abolishing the phenomenon of "heat". If the ovaries are then transplanted without undergoing complete atrophy, the phenomenon of heat will re-occur even though all possible nervous connection may be destroyed.

Thus, since it has been demonstrated that the pelvic organs do not influence the mammary tissue through the nervous system, we must conclude that the relation between the growth of the mammary gland and the fetus is chemical in nature and that this chemical excitant is carried by the circulating blood.

Hildebrandt¹⁰ has advanced the theory that during pregnancy the developing ovum exerts an "impulse" which acts as a stimulus to growth and at the same time prevents the autolytic disintegration process which he believes produces the specific constituents of the milk.

Lane Claypon¹¹ and Starling have shown that abortion, or the removal of the fetus, uterus and uterine appendages (Porro's operation), before about the middle of gestation in pregnant rabbits, immediately stops the growth of the mammary glands which quickly

atrophy to their normal size. If Porro's operation was performed after the middle of pregnancy, milk could be expressed from the nipple two or three days after the operation.

Halbane¹² observed from clinical evidence that when the premature death of the fetus occurs without its expulsion there is a swelling of the breasts and soon after, milk secretion. This result is not inevitable, as he has observed that in certain cases milk was not secreted until after the expulsion of the fetus. He has concluded from these observations that the placenta produces the chemical excitant which causes the hypertrophy of the mammary glands and that the appearance of milk in the gland is due to the death or expulsion of the placenta.

These observations as well as those of Lane Claypon and Starling show conclusively that neither the growth of the mammary gland nor milk secretion after parturition can be due to stimulation of the gland at the time of conception since the removal of the fetus during the early part of gestation stops mammary growth and causes the gland to return to its normal size, while the removal of the fetus later in gestation, even before full time, causes milk secretion.

These investigations substantiate Hildebrandt's¹⁰ theory that the chemical excitant of mammary hypertrophy inhibits the secretion of milk and its withdrawal from the system initiates milk secretion.

Miss Lane Claypon and Starling¹¹ have attempted to determine experimentally which one of the pelvic organs produces this chemical excitant or whether or not it is elaborated by the developing fetus. They have worked on the assumption that the gland or body that produces the chemical "hormone" which stimulates mammary hypertrophy when extracted and injected into virgin animals will cause a similar growth in the mammary gland to that occurring in pregnancy.

They consequently made saline extracts of ovaries, uterus and uterine mucous membrane, placenta and fetus. These extracts were either centrifuged, or mixed with "kiesel-guhr", the expressed juice obtained by means of a Buchner press, and then sterilized by passing through a Berkfeld filter. They were injected either subcutaneously or into the peritoneal cavity of virgin rabbits.

They made several injections during each period of about

fifteen days, trying, as near as possible, to approach the natural condition in which a small amount of hormone is continually circulating in the blood. All of their experiments, excepting those in which the extracts of the bodies or viscera of the fetuses, were used gave negative results.

The experimental rabbits were from eight to twelve months old and in these animals, the glandular tissue could not be detected with the naked eye. In order to compare the rabbits injected with those used as controls the gland tissue was removed and stretched on a cork and hardened, then stained with a dilute solution of hematoxylin and the muscle fibres dissected away leaving only connective tissue and a small amount of glandular tissue surrounding the nipple. In the virgin control rabbits the glandular tissue surrounding the nipple consists of ducts which end blindly and rarely ever occupy more space than one square centimeter. The glandular tissue of some of the rabbits that had received injections of fetal extract covered many times this space and the original ducts had thrown out branches toward the periphery which ended in alveoli. In some cases watery fluid resembling milk could be expressed from the nipples. The glands greatly resembled those of rabbits fourteen to fifteen days pregnant.

They concluded from their experiments that the growth of the mammary glands during pregnancy is due to a particular chemical stimulus elaborated by the fertilized ovum and carried to the mammary glands by the blood stream of the mother; that the amount of this chemical substance produced increases with the growth of the fetus and that it acts to inhibit milk secretion; that its removal by the expulsion of the fetus allows the mammary gland to secrete.

Soon after the publication of their work other physiologists began similar investigations.

C. Foa¹⁸ made subcutaneous injections of bovine fetuses into virgin rabbits for a period of twenty days. After the fifteenth day there was a noticeable enlargement of the mammary glands and on the twentieth day a drop of milk could be expressed from the nipple of the two rear glands. No effect was produced by the extract when it was previously heated to 110°C.

According to the fetal-hormone theory, the injection of fetal extract in lactating animals should inhibit milk secretion. To test this, Foa injected fetal extract into lactating rabbits and found that the secretion of milk was not inhibited.

As a result of his experiments, he concluded that the fetal hormone is not specific to species and is destroyed by heat.

Biedl¹⁴ und Königstein found that the injection of the placental extracts or implantation of placenta into young non-virgin rabbits would cause a histological change in the mammary glands. They also observed that in castrated virgin rabbits, the injection into the peritoneal cavity of an extract of rabbit fetuses, or the intraperitoneal transplantation of rabbit embryo would in all cases produce a more or less rapid growth of the mammary glands. There was an increase in the size of the teat and also an increase of glandular tissue. In the deeper tissues of the gland were found secretory acini, some with wide open lumen and others in an early stage of development. They also observed that the injection of fetal extract had a more powerful effect on the growth of the gland than the intraperitoneal transplantation of rabbits fetuses.

These experiments support the Lane-Claypon Starling fetal hormone theory, but Aschner und Gregoriu¹⁵ are of the opinion that the mammary hormone is contained in both the fetus and placenta. When they injected either the water extract or the ground up pulp of fetuses or placentae into virgin rabbits, they obtained mammary hypertrophy and eventually milk secretion. They observed that the active hormone was destroyed by heat and alcohol. They injected the extract into male animals and obtained mammary hypertrophy and colostrum formation and in very young male animals milk secretion.

The extract of bovine fetuses when injected into female rabbits, produced slight change in the mammary glands. Corpus luteum extract was less effective than the extract of the ovaries. Testicular extract produced some change in the gland and caused the formation of colostrum but did not increase the number of secretory acini nor result in milk secretion. In as much as the mammary hypertrophy could be produced in male animals, they concluded that the ovaries were not essential to mammary growth during pregnancy.

Halbane¹⁶ is of the opinion that the experimental proof of the fetal hormone theory is insufficient and believes that the results obtained after the injection of fetal extract were due to the effect of the period of heat rather than to any hormone in the fetal extract. He is of the opinion that the mammary hormone is produced by the corpus luteum of pregnancy.

Other physiologists ascribe the growth of the mammary glands to the secretory activity of the corpus luteum during pregnancy.

Ancel and Bouin¹⁷ have divided experimental animals into two groups; group I includes animals which have spontaneous periodic ovulation. In this class they have placed man, monkey, cow, horse, swine, and dogs. In group II they have placed animals that have not a spontaneous periodic ovulation but whose ovulation is excited by coitus.

These animals would only have a corpus luteum of pregnancy. In this group we have rabbits, guinea pigs, cats and mice.

When a rabbit is bred to a buck with the vas deferens cut so that pregnancy will not ensue, a corpus luteum will be formed by the graafian follicle ruptured by the stimulus from the coitus. In this manner they were able to form corpora lutea in non-pregnant rabbits.

The corpus luteum thus formed would increase its size, reaching its maximum in about fourteen days and then decline. They observed similar periods of growth in the mammary glands. The first period they called the constructive or kinetic period, lasting about fourteen days, during which mammary growth is very rapid and new secretory acini are formed. This phase they contrast with the constructive phase of the corpus luteum and believe that the mammary growth at this time is due to its secretory activity since they were enabled to obtain it in normal non-pregnant animals in which a corpus luteum had been formed. When the corpus luteum thus formed was destroyed with the cautery, the mammary glands failed to develop.

The second phase they called the phase of secretory activity in which they observed regressive changes in the gland. They believed this phase to be due to the secretory activity of the "myometral gland" which they claimed to have demonstrated exists in the muscular walls of the pregnant uterus.

They described the "myometral gland" as a spindle or polygonal shaped gland composed of different sized cells having a dark granular protoplasm. According to Keifer, this gland reaches its maximum activity about one week before parturition.

Frank and Unger¹⁸ were unable to obtain any change in the mammary glands of white rats after the injection of fetal and placental extracts of the same or of different species. Their experi-

ments upon rabbits in most cases also gave negative results. They were, however, in one case able to obtain a marked change in the mammary gland after the injection of fetal extract. The injections of placental extract for the most part were ineffective, but in one instance, as marked results were found as those obtained from the fetal extract. Out of many experiments they were enabled to obtain positive results in a few instances by the injection of ovarian extracts or the extracts of the hypophysis, (pituitary body).

In one instance they obtained in a normal virgin rabbit a very marked hypertrophy of the mammary gland during the period of heat. At the beginning of this period, the gland was very small as shown by their figure. Twenty-four days later, it was many times as large and corresponded to the glands normally found in animals of the ninth or tenth day of pregnancy. This result is almost as remarkable as those obtained by Starling after the injection of fetal extract. Frank and Unger observed a large corpus luteum in the ovary of this rabbit.

In accordance with the view that mammary growth is stimulated by the secretory activities of the ovaries, we have the work of K. Basch¹⁹. Into a young female animal Basch transplanted the ovaries of a pregnant dog and obtained, fourteen days later, an increase in size of the mammary gland and in six weeks a marked hypertrophy of the same. Two weeks later, after the injection of placental extract, he obtained milk secretion.

By injecting placental extract into growing virgin rabbits, O. O. Fellner²⁰ was able to show a marked growth of the mammary gland and a rapid formation of glandular acini. He also obtained, coincident with the mammary hypertrophy, a very marked increase in the size of the uterus and vagina.

From these discordant views of eminent physiologists, it is difficult to draw any positive conclusions. It is probable that the mammary hormone may be isolated from organs or bodies that are not the seat of its manufacture. This in part may account for the discordant results.

That the mammary growth obtained after the injections of fetal extract cannot be due solely to the changes accompanying the estrous cycle is shown by the experiments of Biedl und Königstein¹⁴ when castrated animals were used and also by Ashner und Gregoriu¹⁵ when male animals were used. Perhaps all the pelvic organs have normally some effect upon mammary growth.

The evidence given for and against the fetal hormone theory thus far has been evidence obtained from normal animals. If we consider the mass of evidence that can be obtained from abnormal cases the problem seems still farther from solution.

Rare instances are on record where men and other male animals have secreted milk which indicates that mammary secretion is not solely a female function.

Virgin girls have been known to secrete milk by allowing infants to suckle their nipples. Other cases are on record where virgin animals have been brought into lactation by mechanical manipulation of the udder.

Several objections to the fetal hormone theory have been advanced by Heape²¹. He quotes a huntsman as stating that virgin bitches were frequently known to produce sufficient milk to permit the rearing of pups; and that the commencement of the secretion of milk in these animals was at the time when they normally would have whelped had they conceived in the preceding oestrous cycle. He uses this argument to show that the development of the mammary gland is due more to the action of the "generative ferment" or "gonodine" secreted by the ovary than to other influences.

A very forcible objection to the fetal hormone theory is supplied by the monotremes. In these oviparous animals, the developing embryo is contained within an egg which does not enter into any connection with the uterine wall. Halbane, however, has pointed out that since the shell is porous there is a possibility that some other substance produced by the developing embryo may diffuse out through the shell and be taken up by the capillary of the uterine mucous membrane and carried to the blood stream of the mother.

Another objection to the fetal hormone theory is given by Lombroso and Balaffio²². These authors grafted two female rats so that their circulatory systems were presumably united. These rats became pregnant, but at different times, and gave birth to young, one of them prematurely but the other at full term. Their mammary glands developed independently instead of simultaneously as would have been the case had they both received the same stimulation.

Directly in opposition to this experiment, we have the case of the Bohemian Pygopus twins Rosa-Josepha²³, the mammary

glands of both being simultaneously affected by the pregnancy of Rosa who bore a healthy son on April 17th, 1910. The mammary glands of both Rosa and Josepha secreted milk although Josepha had never conceived. They were known to have a common circulation and the glands of Josepha therefore were most probably stimulated through the blood stream.

THE CAUSE OF MILK SECRETION AFTER PARTURITION. The actual cause of milk secretion after parturition has not as yet been definitely determined.

Hildebrandt has advanced the theory that the fetal hormone while stimulating the growth of the mammary glands inhibits their secretory activity. He believes that the removal of the hormone from the system by the birth or the expulsion of the fetus allows the secretory activity of the mammary glands to respond resulting in milk secretion. Lane-Claypon, Starling, and others have accepted this theory.

The following are some of the objections which may be offered to this theory. Injection of the blood of the pregnant animal into a lactating animal of the same species does not always inhibit milk secretion. Foa¹³ and also Mackenzie²⁴ found no inhibitory influence resulting from the injection of blood from a pregnant into a lactating animal.

D. Errico²⁵, however, obtained a marked inhibition of milk secretion by injection of blood from a pregnant to a lactating bitch. Gaines⁶⁶ has obtained similar results.

Placental extract, according to some authors, when injected will cause a growth of the mammary gland, in some instances quite as remarkable as that obtained by the injection of fetal extract. Marked galactagogue properties are ascribed to placenta extract and similar properties have been ascribed to fetal extract. If this be true, we would expect fetal and placental extract to exert a stimulating rather than an inhibitory effect during pregnancy.

Likewise, corpus luteum extract, believed by some authors to be responsible for the growth of the mammary gland during pregnancy has a powerful galactagogue action.

Wing²⁶ has advanced a theory that while maternity is the prime incentive to milk secretion, yet the immediate stimulus to the production of milk is the "turning of the blood which formally went to nourish the fetus from the arteries of the uterus to the arteries of

the udder." As a result of the increased pressure of the blood in the vessels of the udder the secreting cells are stimulated to greater activity and quickly changed from a dormant to an actively secreting state. Due to the fact that the various processes of secretion are at first incomplete, the first milk secreted differs in composition from that secreted later. It contains less water and more albumen, but a smaller percentage of casein, "as the transformation from albumen to casein is not at this time so complete as later in the period of lactation," this milk is known as colostrum and contains more cells, resulting probably from leucocytes and detached epithelial cells, than normal milk.

McKay and Larsen²⁷ agree with Wing on this theory and claim that the increased pressure of the blood in the minute capillaries, which form a network in the walls of the alveoli, causes it to swell. This swelling stimulates the epithelial cells to activity resulting in milk secretion.

The saline extract of certain internal secreting glands, and especially of the pituitary body, has powerful galactagogue properties. From these properties one might conclude that these internal secreting glands play an important role in the stimulation of mammary activity. The pituitary body is generally conceded to enlarge during pregnancy so that at parturition we would expect a hypersecretion from this gland. If the fetal hormone theory is correct, we might conclude that the removal of the inhibitory hormone by the expulsion of the fetus would permit the secretions from the pituitary and other secreting glands to stimulate mammary secretion.

This later theory has not been substantiated for no one has proved that the blood of a lactating animal does contain a hormone which is able to stimulate milk secretion and Foa has experimental evidence to show that it does not.

To test this point he used three goats, one virgin and two lactating. They were all etherized and placed side by side on a table, a lactating goat in the center. The carotid artery of the virgin goat was attached by means of a canula to the mammary artery on the left side of the center goat and the mammary vein to the jugular vein of the virgin goat, so that when the clamp was removed the left half of the mammary gland was nourished by the blood of the virgin goat. In a similar manner the right half of the mammary gland was nourished by the blood of the other lactating goat.

The gland continued to secrete milk which was drawn after two and after seven hours from the beginning of the experiment, the milk from the two sides of the udder being kept separate. No differences were observed in the quantity or quality of the milk from the two halves of the udder due to the different sources of blood supply.

Foa has therefore concluded that the blood merely carries nourishment to the gland and does not contain a hormone which stimulates its secretory activity.

According to Gaines⁶⁶ the transfusion of blood from a fresh heavily milking goat into a low milking one, fails to accelerate milk secretion.

THEORIES OF MILK SECRETION. The nature of mammary secretion is less clearly understood than that of any other of the external secreting glands. Truly, it may be said, that when we attempt to obtain a concise view of the manner in which the various constituents of the milk are secreted we are standing entirely on theoretical ground.

Prior to 1840 the mammary glands were thought to act simply as a passive filter to separate out the constituents of the milk from the blood and lymph. Another theory was that the milk represented decomposition products of the lymph bodies of the blood. The views of Liebig⁴, and Rapsail² and others have already been given. It was also believed that the lymph bodies were a source of nourishment to the fetus as well as to furnish the nutriment material for the secretion of milk to nourish the young after birth. "It was supposed that after the birth of the calf, the opening of the uterus from which the food was supplied was closed and then a new opening was formed in the milk gland."²⁷ These old views have been abandoned for theories more in accordance with ascertained facts.

Neither the blood nor the lymph contains all the constituents of the milk since both lactose and casein are normally absent from blood and lymph. This completely disproves any theory which views the functions of the mammary gland as simply that of a passive filter.

Just how the various constituents of the milk are formed and the source of the material from which they are built up is still not definitely known. While several theories of milk secretion have been advanced, none of them have as yet become well established.

In the actively lactating gland, two distinct phases can be observed. These may be classed as first, the active or secretory, and the second, the resting stage. In the latter condition the alveoli are wide and lined by a single layer of flattened epithelial cells containing but one nucleus. During active secretion, the epithelial cells are long and columnar and some of them project into the lumen of the alveolus; they frequently contain two nuclei and are often charged with fat globules. These fat globules and also many other cells which are probably leucocytes find their way into the alveoli.

In their evolution, the mammary glands were probably developed either from the sebaceous or sweat glands. In the monotremes, they are stated to be modified sweat glands. These animals differ from other species in not having teats and simply exude the milk from scattered pores in the skin. The milk probably passes along hairs which in these regions are arranged in bunches.

In other mammalian orders, the mammary glands are regarded by many (Virchow)²⁸ as modified sebaceous glands.

Broucha²⁹, Bresslau and several authorities, however, regard the mammary glands in all mammalia as modified sweat glands.

There is a tendency for those who hold the view that the mammary glands are modified sebaceous glands to expect mammary secretion to resemble closely the secretion of these glands. For example:—Virchow, who represents the old school of physiologists, believes that the fat in the milk is formed in the same manner as the oil in the sebaceous glands, i. e. from fatty degeneration of the epithelial cells. If this theory were true the epithelial cells would need to be entirely destroyed to furnish the organic constituents of the milk. The colostrum corpuscles were also thought by him to be detached epithelial cells.

There are several sound objections to this theory and the following is one of the most potent:—if the organic constituents of the milk were formed entirely from the epithelial cells an enormous number of these would be necessary to furnish the constituents of the milk.

Heidenhain³⁰ has shown that all the glandular tissue would need to be renewed at least twice daily and if the epithelial cell alone were used at least five times daily to furnish the solid constituents of the milk. We have no evidence of such rapid cell multiplication as this would necessitate.

The following theory is perhaps the most widely accepted. It was first suggested by Langer and has since been slightly modified and adopted by Heidenhain³⁰, Steinhaus³¹, and Broucha²⁹, and others. It may be classed midway between the other two theories and is founded on the hypothesis that the secretion of milk is partly due to the disintegration of the cell and partly to the secretory activity of the gland itself.

During active secretion the epithelial cells of the alveoli become columnar in shape and extend into the lumen of the alveolus. According to these authors some of these elongated columnar cells have two nuclei and mitosis is occasionally seen. During secretion the fat globules and one nucleus collect at the free end of the cell which is then snipped off and gives its body substance for the formation of the solid constituents of the milk. The basal portion remains to regenerate the cell. This theory has been most generally known as the cell decapitation theory. To explain the reasons for the cell decapitation in mammary activity the following theory has been advanced:—at the beginning of mammary activity a large amount of blood flows through the arterioles of the epithelial cells furnishing them with a rich supply of food material. This causes them to swell, resulting in the formation of the columnar cells which extend into the lumen of the alveoli. As a result of this swelling the arterioles become compressed, therefore the blood supply is diminished. The supply of blood going to the outer parts of the cell is consequently shut off and they disintegrate and pass into the lumen of the alveoli leaving the basal portion which forms the cubical epithelium. As the products of the secretion are removed, the arterioles are less and less compressed until finally the blood can again circulate freely and supply new nutrient material to the cells which in turn stimulates them to activity. This results in the formation of columnar epithelium which extend into the alveoli and are in turn decapitated to form the next supply of milk.

The same objections may be made to this theory as were advanced against the first mentioned theory, viz. that there is no evidence of such rapid cell modification as would be necessary to replace the outer portions of these cells at each milking. Although only a portion of the cell is supposed to disintegrate to form the constituents of the milk, yet this only differs in degree from the former theory.

Bertkau's³² objections to the cell decapitation theory are based mainly on his own histological researches. He cut sections of the active tissue of the mammary gland of a cow, dog, and of man and fixed one of each in formalin, and Zenker's fluid respectively. The tissue fixed in Zenker was later sectioned and stained. When microscopically examined, the alveoli were found to contain numerous detached epithelial cells and the phenomenon of "decapitation" was frequently seen. The tissue that was hardened in the formalin presented an entirely different appearance, practically all the epithelial cells were papilliform and extended into the lumen of the alveoli. In some instances, the outer portions of the cells had been torn off leaving the basal portions with a rounded or sometimes a ragged edge. In some sections the outer portions were still loosely attached. The appearance of the cell decapitation was therefore observed much less frequently than in the tissue imbedded in paraffin. Bertkau observed no evidence of mitosis and concluded that the appearance of the decapitation was due solely to imperfect fixation and not glandular activity. Bertkau believes that the mammary glands were evolved from sweat glands and that the secretion of mammary glands is analogous to the secretion of the sweat glands, salivary glands and most other secreting glands and that the solid constituents of the milk are formed entirely as the result of secretory activity of the gland and not from any of the vital constituents of the same. The colostrum corpuscles are believed by those who hold this view to be wandering leucocytes which have passed to the mammary gland from the blood stream.

CHEMISTRY OF MILK SECRETION. For many years efforts have been made to determine in what form and manner the various organic constituents are secreted. In spite of all the research that has been done along this line I think I am justified in stating that we do not definitely know how a single constituent of the milk is formed. Several plausible theories, however, have been advanced to account for their formation.

It is possible that the inorganic constituents of the milk are simply diffused from the blood since they occur in all normal blood. That there must be some selective absorption or some arrangement whereby a diffusion of the salts is altered is shown by the fact that they do not occur in the same proportions in the milk as they occur in the blood. Sodium and potassium salts, for example, exist in the reversed proportion to what they do in the blood.

The fats secreted in the milk are at least partially formed from body fat or fat circulating in the blood which nourishes the mammary glands. That this is true to a certain extent is shown by feeding fats of a low or high melting point and thereby lowering or raising the melting point of the butter fat. Butter fat is a special mixture of different neutral fats and differs in composition from any other fat found in the body. This would indicate at least a selective absorption on the part of the cells.

Arguing from the analogy between the mammary glands and the sebaceous glands some authors (Virchow²⁸) believe that fat results from a fatty degeneration of the epithelial cells.

During the active secretion of milk, the epithelial cells of the alveoli contain numerous fat globules which collect chiefly in the free end and are stained black with osmic acid. Steinhaus³¹, Nissen, and Heidenhain³⁰ believe that the decapitation of the epithelial cells permits these fat globules to be set free and thus form the fatty constituents of the milk.

Benda advances the theory that the fat is produced by the secretory activity of the cell and is expelled by a contraction of the cell protoplasm; that the cell itself is not destroyed.

It seems probable that the fat of milk may be formed from either body fat, as is claimed by Soxhlet²³, Caspari³⁴, Henriquez and Hansen³⁵, or from carbohydrates as shown by Jordan and Jenter³⁶, and also possibly from proteins.

As proof of the latter statement, a dog was fed on pure muscular tissue and according to Ssubotin³⁷ and Kemmerich³⁸, the milk it secreted contained much more fat than could be accounted for in the constituents of the food. It has also been demonstrated that by increasing the fat and protein content of the food, a slight increase in the fat of the milk may be obtained. During starvation in lactating animals the milk yield does not greatly decrease on the first day after the beginning of the fast. Voit³⁹ cites this as evidence that the milk constituents are formed from epithelial cells which are replenished from the food of the previous day.

Foa's⁴⁰ experiments in the perfusion of the mammary gland with normal salt solution containing a known and varied content of proteins, sugars, and fats are very interesting although I do not think at present sufficient work has been done to justify definite conclusions.

He perfused the mammary gland of a lactating goat with a perfusion fluid containing different food constituents.

The gland was retained in situ and kept warm during the experiment and the following are the conclusions arrived at:

The fats of the milk are not formed from carbohydrates or proteins but from fats. Among the fats the mammary gland has the power to choose certain ones and reject others. The casein of the milk is not formed from proteins, differing from those occurring normally in the blood, such as gelatin and egg albumen which is free from globulin; nor from carbohydrates and fats. The production of lactose increases with an increase in the glucose content of the blood indicating that lactose of the milk is formed from the glucose of the blood. The lactose is not derived from the fat or proteins.

According to recent views, the albumen and casein of the milk are formed at the expense of the protein supply of the body or food. Some authors believe casein to be formed from a nucleo-protein resulting from the disintegration of the nucleus of the epithelial cell lining the secreting alveoli. Casein being a phospho-protein may be closely related to the nucleo-proteins.

Other authors believe that casein is formed from albumen by a ferment present in the mammary gland. The comparatively high albumen and low casein content of colostrum as viewed by certain authors is due to the fact that the change from albumen to casein is not so quantitative in the gland immediately after parturition.

Considerable research has been directed toward determining the source of the lactose in the milk and the following are some of the theories and experiments that have attracted attention:

Bert⁴¹ removed the mammary gland of pregnant goats and observed as a result a marked post-partum glycosuria. He concluded that at the time of parturition, the liver was stimulated to produce more than a normal amount of glucose; that when the mammary gland was functioning, this glucose was changed to lactose and secreted in the milk. When the mammary glands are removed, this increase in glucose could not be excreted as lactose of the milk and as a result a hyperglycaemia followed by glucosuria is produced.

Porcher⁴² has repeated Bert's experiment and obtained similar results. He also removed the mammary glands of lactating animals

and observed as a result a marked glycosuria. He concludes that Bert's theory was established beyond a doubt. Moore⁴³ and Foa⁴⁴ have removed the mammary glands in pregnant guinea pigs and failed to obtain post-partum glycosuria. Marshall⁴⁵ and others have obtained no post-partum glycosuria in guinea pigs as a result of mammary ablation during pregnancy. The removal of the mammary glands in lactation also failed to cause glycosuria. They concluded that the glycosuria obtained by Porcher could be explained as being normal glycosuria which often accompanies parturition even without mammary ablation, and the glycosuria obtained after the ablation of the mammary glands in lactating animals is due to the operative shock. In his reply, Porcher maintains that the reason the last mentioned authors did not obtain glycosuria was because they did not test the urine until twenty-four hours after parturition. He maintains that when the increased production of milk is not used by the mammary gland that its production ceases and sugar in the urine is soon checked. He also criticises Marshall and Kirk's experiments on guinea pigs which he claims are normally pure milkers.

According to his work, in cases of milk fever, either an acetosuria or glycosuria or feeble lactosuria follows the stoppage of mammary secretion.

Von Norden⁴⁶ found that when glucose was injected into a newly lactating goat, that not glucose but lactose appeared in the urine. Porcher⁴⁰ has repeated this experiment using a lactating dog with similar results and cites this as an additional proof that lactose in the milk is formed from the glucose of the blood.

The author has obtained a marked glycosuria but no lactosuria in a lactating goat about four months advanced in lactation after a subcutaneous injection of 4.05 grams of glucose per kilogram body weight.

Inasmuch as phloridzin diabetes decreases the glucose in the blood below normal, one might expect it to influence the lactose content of the milk.

Cornevin⁴⁷, as the result of his research has concluded that phloridzin diabetes increased the lactose content of the milk. Pappenheim⁴⁸ and Cremer⁴⁹ from similar experiments have concluded that the amount of lactose in the milk was decreased in phloridzin diabetes as well as glycosuria was observed. Their results were in contrast to those obtained by Paton and Cathcart⁵⁰.

According to Porcher⁴² phloridzin diabetes does not alter the percentage of lactose in the milk but since the total milk secreted is markedly diminished, the daily yield is decreased in the same proportion as the other milk solids.

The experiments of Kaufman⁵¹ and Magne upon dairy cows would indicate a formation of lactose from dextrose. They analyzed samples of blood taken simultaneously from the mammary vein and the jugular vein during active milk secretion and again when the gland was not secreting milk. They observed from these analyses that the blood coming from the head and also that from the mammary gland, when it was not in a state of active secretion, contained about the same amount of glucose while when the gland was actively secreting, the glucose content of the blood coming from the mammary gland was much lower than that coming from the head.

EFFECT OF THE INJECTION OF ANIMAL EXTRACTS ON MAMMARY SECRETION. As has been previously stated, certain organs and glands when extracted and injected exhibit galactagogue properties. The corpus luteum and placenta have been previously mentioned in this regard. To me this field of research has been very interesting as it reveals a possible method used by nature in stimulating mammary secretion. It may lead to some interesting discoveries regarding the nature and manner of mammary secretion. There is also a possibility of eventually obtaining a practicable application of our knowledge derived from this field of research.

Lederer⁵² and Pribram were among the pioneers in this field of research. They made a series of experiments upon a goat in which a canula was inserted into the nipple and the amounts of milk secretion measured both under normal conditions and after the injections of extracts under experimental investigation. They found that the extracts of placenta produced a marked increase in milk secretion while ovarian extract was without effect.

In a pamphlet on internal secretion written by Ott and Scott⁵³ of Philadelphia in 1910, the statement was made that "infundibulin" (20% extract of the posterior lobe of the pituitary) was a powerful galactagogue." In October, 1911 they published the full results of their experiments. As experimental animals they used lactating goats which were bound down and not etherized and the milk secreted by the gland was removed by a water aspirator. They recorded the number of drops secreted during five minutes under

normal conditions and during a similar length of time after the injection of the extract to be studied.

They observed that in one instance the secretion of milk was increased from 5 drops per five minutes to 405 drops per five minutes, by the intravenous injection of five drops of "infundibulin" (a 20% extract of the posterior lobe of the pituitary body). They also tried the action of other animal extracts but found none so powerful as the extract of the pituitary.

The extracts they found that stimulated milk secretion were:—pituitary (the strongest), corpus luteum, pineal gland, and thymus, while they observed that the extract of the ovary, spleen, pancreas, and adrenalin and iodothylin inhibited milk secretion.

They observed that neither the albumen nor the choline constituents of the extracts were responsible for their action.

Upon receiving Ott's notice that infundibulin was a powerful galactagogue Schäfer and Mackenzie⁵⁴ began a series of investigations with the so-called galactagogues.

They used mainly lactating cats but lactating dogs were occasionally employed. The milk secreted was led off from the teat either through the nipple or by the exudation method to a drop recorder and a kymographic record taken simultaneously of the milk secretion and blood pressure. In the exudation method the ducts of the gland were incised and a lamp wick was placed in the cut portion. When the milk was drained off directly from the nipple, the teat was incised enough to allow a canula to be tied into it in this way overcoming the action of the sphincter muscle of the teat. The animals were etherized or chloroformed and the anaesthesia maintained by subcutaneous injections of chloral. They used a normal saline extract of the posterior lobe of the pituitary body and arrived at the following conclusions:—

That the extract of the posterior lobe of the pituitary body including the *pars intermedia* and *pars nervosa* when injected intravenously, invariably produced a marked flow of milk within about twenty seconds after the first injection. The flow of milk was rapid at first but gradually became slower and stopped after a period of three or four minutes. A second injection after thirty minutes caused a much smaller secretion than the first and in some cases no response was obtained. They also confirmed Ott and Scott's re-

sults in regard to the galactagogue action of corpus luteum extract.

The researches started by Schäfer and Mackenzie were later continued by Mackenzie⁵⁵.

He found that the action of the extract was not specific to species or even to mammals since the pituitary bodies of cattle, male animals and even birds produced a decided milk secretion when injected into lactating cats. In this regard, it is interesting to note that Herring⁵⁶ has demonstrated that the extract of the cod's pituitary body possessed galactagogue properties.

The amount of pituitary extract used by Mackenzie was 5 c.c., which represented the active principle of three ox pituitaries. The extract was found to be insoluble in alcohol and its activity was not impaired by boiling and prolonged treatment with alcohol.

The animal extracts which he found gave positive results were those of the pituitary body, corpus luteum, pineal gland, mammary gland and involving uterus. Of these extracts, the extract of the pituitary body was by far the most powerful.

The injection of pilocarpine and atropine previous to the injection of pituitary extract does not inhibit its action which justifies the conclusion that it acts on the glands directly and not through the nervous system.

Fetal extract had a decided inhibition on the secretory activity of the gland due to pituitrine. This would seem to substantiate the fetal hormone theory.

Schäfer⁵⁷ records an experiment performed on a young married lady nursing her second baby, by Dr. W. J. E. Sumter. The baby was entirely breast fed and was beginning to want more milk than the mother was able to supply. From 1 to 1½ c.c. of pituitary extract, representing two grams of posterior lobe of pituitary body, were injected intramuscularly on four different occasions, intervals of two or three days. In all cases except after the first injection, the extract seemed to have an immediate action. The patient could feel the milk coming in with a "tingling sensation", there was no apparent increase in the yield for the entire twenty-four hours since the baby did not seem to receive more than usual on the days when injections were given.

The following table gives the immediate results of the action of pituitrine:

"Five minutes pumping before injection of 1.5 c.c. of pituitary extract"

tary extract yielded 2.5 drams (9 c.c.) of milk. Five minutes pumping after the injection of 1.5 c.c. of pituitary extract yielded 9 drams (32 c.c.) of milk."

Mackenzie⁶⁶ records one experiment with pituitrine extract on a woman, in the tenth month of lactation who was suffering from a mammary abscess in one breast. The healthy breast alone was observed. It was emptied with the suction pump yielding 60 c.c. of milk and immediately an injection of pituitrine was given. The gland was again emptied one-half hour later and 100 c.c. milk were obtained.

None of these experiments give evidence of permanent increase in milk secretion or even a prolonged effect resulting from pituitary injection. In order to determine whether the total amount of milk per day was influenced by injection of pituitary extract, Gavin⁶⁸ began a series of experiments upon lactating cows. He divided his experimental animals into three groups. Group A consisted of four cows; two of them were fed 1.8 grams of dessicated pituitary body (about five whole glands) and the other two were fed 3.5 and 5 grams respectively, of mammary gland.

There were also four cows in group B, two of which were injected at 6:45 A. M. immediately after milking, "with seven c.c. pituitrine" (equals 3.5 grams fresh gland or .7 gram of the infundibular lobe). Cows III and IV were injected at 3 P. M. and milked one-half hour later.

In group C intravenous injections of 7.5 c.c. of double strength pituitrine (equal 1½ infundibular lobe of fresh gland) were given as one injection into cows I and II. Cows III and IV were injected with corpus luteum extract while cows V and VI were used as controls. Gavin has concluded from the results of these experiments that under ordinary farm practice no commercial benefit can be derived from the use of pituitrine since neither the total quantity per day nor the quality of the daily sample of milk was effected by the use of pituitary in any of his experiments.

Some very interesting experiments upon the effect of pituitary extract on the secretory activity of the mammary gland in lactating goats were performed by John Hammond⁶⁹. He used goats in various stages of lactation and the amount of the injection was usually 1 c.c., Parke, Davis & Co. or Burroughs & Wellcome and Co.'s commercial extract of the posterior lobe of the pituitary body, given subcutaneously.

He observed that pituitary extract, when injected into lactating goats has an immediate galactagogue action on the mammary gland but the effect soon passes off; that the fat content of the milk received after injection is increased and there is a corresponding decrease below normal at the next milking. The proportions of the other solid constituents of the milk do not seem to be altered by the injection.

Smaller doses give less milk with a lower percentage of fat than larger doses, but there is a limit in the size of the dose beyond which an increase in amount injected will not result in a corresponding increase in the secretion of milk.

He concluded that the increase in blood pressure resulting from the injection of pituitrine was not responsible for its galactagogue action and that it acted on the epithelial cells of the alveoli and not on the muscles present.

Hill and Simpson⁶⁰ observed that by injecting pituitary extract into a lactating angora goat a decided increase in milk secretion could be obtained and that the milk so obtained was abnormally high in fat content. The injection was made either just fifteen minutes before milking or immediately after milking in which case the goats were milked again fifteen minutes after the injection.

In one instance fifty cubic centimeters of milk testing 12.9% of fat was obtained at the evening milking. Immediately after milking the goat was injected with pituitary extract and fifteen minutes later yielded 40 c.c. of milk testing 18% of fat. In this instance 64.5 grams of fat were obtained from the normal milking, and 136.5 grams (72 grams more) were obtained 15 minutes later as a result of pituitary extract injection. There was, however, a corresponding decrease in the milk secreted at the next milking. So that the total secretion per day was not materially increased by the injection. It appears as though a part of the milk which would normally be secreted at the next milking period is obtained as a result of pituitary injection.

Of the solid constituents of the milk only the fat was altered by the injection of pituitrine the other constituents remained constant throughout the experiment.

Hill and Simpson⁶¹ also investigated the action of pituitary extract on milk secretion in the cow and obtained similar results to those obtained when a lactating goat was used.

The injection given the cow was much larger than that previously used by Gavin⁵⁸. The saline extract of eight posterior lobes of the pituitary was given as one injection. In one experiment upon a Jersey cow a yield of 8.3 lbs. of milk testing 7% fat was obtained at the evening milking. The Ringer's solution extract of eight pituitary bodies (post. lobes alone) was immediately afterwards injected into the external jugular vein. Three minutes later the cow was milked again yielding one pound of milk testing 19% fat. About one-third as much fat was secreted as a result of pituitrine injection as was normally secreted before injection. To obtain one pound of 19% fat in milk from a cow is also remarkable. The next morning there was a corresponding diminution in the amount of milk secreted, and also in the percentage of fat it contained.

The effects of pituitrine injections upon the milk secretion in the human subject was likewise investigated by Hill and Simpson⁶², the subject being a young married woman 24 years of age, in perfect health, who was nursing her second child. The procedure adopted was as follows:—

The baby was nursing in the evening, about eight p. m. from both breasts, presumably emptying them. One hour later 1 c.c. of Parke, Davis & Co. Pituitrine was injected into the biceps humeri of the left arm. "Almost immediately afterwards, in about 20 seconds, the patient could feel the milk coming into the breasts, as she described it. The sensation was something between a tickle and a sting and was similar to that experienced when the baby begins to nurse". Ten minutes later the milk was withdrawn from both glands with a breast (suction) pump. Fifty cubic centimeters of milk testing 6% fat were obtained. On three control days when the same procedure was followed except that no injection was given, the following amounts of milk were obtained:—1st, 7 c.c. testing 3.7% fat; 2nd, 20 c.c. testing 2.8% fat; and 3rd, 13 c.c. testing 3.8% fat. On the average of seven control experiments there was .47 grams of fat secreted in the milk from each one of the milkings, while an average of 3.16 grams was obtained from each of the three milkings when an injection of pituitrine was previously given.

There was no way of accurately testing the effect of the injection upon the amount and quality of the milk secreted next morning. According to the mother there was an apparent diminution

in the quantity and the milk acted as a laxative on the body indicating that the quality was also changed.

In what manner pituitrine acts upon the mammary gland to cause the secretion of milk is now not definitely known. It might affect the secretion of milk by alterations in the blood supply to the gland, but this is unlikely since the first injection of pituitrine, which causes a rise in blood pressure, causes also a secretion of milk. A second injection 30 minutes later will cause a fall in blood pressure but will likewise stimulate the secretion of milk.

The two theories of importance remaining are the following:—

1. That the action is on the secretory epithelium stimulating the cells to active milk secretion; 2. That pituitrine acts simply upon the non-striated muscle fibres of the alveoli of the mammary gland causing them to contract and force out the residual milk which they contain; that this milk would not be obtained by regular milking without the injections. According to this theory no milk is secreted as a result of pituitrine injections.

Hammond⁵⁹ is an advocate of the secretion theory, while the following experiments of Simpson and Hill⁶³ would also appear to lend it support.

The udder of a lactating anesthetized dog was incised so that the milk would flow freely from the cut surface if secreted. A moistened lamp wick was inserted into the incised gland and the free end suspended over the side of the animal in order that the drops from the same would fall upon a drop recorder, and be recorded upon a rotating kymograph. A tracing was taken of the blood pressure changes in the carotid artery by means of a mercurial manometer.

An injection of 1 c.c. of a 1% solution of barium chloride (a powerful stimulant of non-striated muscle) was injected into the femoral vein. Immediately afterwards there was a distinct rise in blood pressure and a slowing of the heart but no increase in milk secretion was observed.

After an interval of three or four minutes 1 c.c. of pituitrine was injected which was followed by the characteristic rise in blood pressure and also a distinct increase in the rate of milk secretion.

Since barium chloride does not stimulate milk secretion but does act on non-striated muscle fibres there is good reason for the conclusion that the action of pituitrine is glandular and not muscular.

Schäfer⁶⁴ is of the opinion that the proof of the glandular (secretory) theory is insufficient and from histological evidence favors the muscular hypothesis.

Gaines⁶⁵ has concluded as a result of his researches that "pituitrine has a muscular action on the active mammary gland causing a constriction of the milk ducts and alveoli with a consequent expression of milk." That the flow of milk produced by pituitrine is dependent upon the amount of milk present in the gland and that there is no evidence of any true secretory action.

He also believes that the capacity of the udder is greater than the volume of milk drawn at one time and that practically all the milk is present in the gland as such at the beginning of milking.

No one has yet demonstrated the presence of non-striated muscle in the mammary gland capable of contraction. Pituitrine may act on both the muscles and the glandular epithelium of the mammary gland but my researches upon the lactating goat indicate that it has a glandular action.

By carefully summing up this article it can be seen that there is a very rich field for research and many important discoveries yet to be made in the physiology of mammary secretion.

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A NEW HOST FOR *FASCIOLA MAGNA*, BASSI. TOGETHER WITH OBSERVATIONS ON THE DISTRIBUTION OF *FASCIOLA HEPATICA*, L. IN CANADA

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In December, 1915, the writer received a deer's liver, which was kindly sent to him by Mr. Kermode, Director of the Provincial Museum. On examining this liver eighteen large flukes were discovered. It was thought that they must be *F. Magna*, and two of them were forwarded to Dr. Ransom of Washington who confirmed the determination.

The interesting part of this discovery lies in the fact that the coast deer is *Odocoileus columbianus*, and therefore that it is a new host for *F. magna*. Dr. Ransom informs me that there are no records published or otherwise in the Bureau of Animal Industry, of its occurrence in *O. columbianus*. The identity of the deer was established beyond a doubt by Mr. Kermode.

According to Hall, 1912, "The occurrence of the large American fluke on the Pacific coast is a matter of speculation at present." Stiles and Hassall, 1908 give the following hosts for *F. magna*: *Bos taurus*, *Ovis aries*, *Equus caballus*, *Boselaphus tragocamelus*, *Cervus canadensis*, *C. dama*, *C. elephas*, *C. virginianus*, *C. unicolor*. The accompanying photograph of the section of the deer's liver shows the great amount of damage done to that organ.

On cutting into the liver the ducts were found to be dilated into pockets, which in some cases were quite large, and in comparing their diameter with the enlargements caused by *F. hepatica* a striking difference will be noted. Both flukes cause a blackening and granular appearance of the bile within the ducts, but in the case of *F. magna*, the pockets which sometimes contain three or four flukes naturally hold more of the "inky" bile.

As to the mortality caused in deer by *F. magna*, it is hard to estimate, however, the injury to this particular liver is quite apparent. Texada Island in the Straits of Georgia is the place the liver came from. A visit to this island was undertaken in January with Dr. White. Unfortunately the expedition was unsuccessful owing to bad weather, only one deer was shot, and no flukes were



FIG. 1. Liver of *O. Columbianus*. Note enlarged ducts, and fluke cut across at point X.



FIG. 2. Sheep's liver. Note flukes at point X.

found. According to the inhabitants of this island a considerable percentage of the deer are parasitized by flukes, and at this time of year (January) show a marked unthriftiness. It would be interesting to compare the clinical picture in deer with that of sheep. As the intermediate host for *F. magna* is unknown, this island seems to me to be an ideal place to investigate the matter, and further work is contemplated.

In all the literature concerning *F. magna* I have come across, no mention is made of the mortality it causes among deer. Ward, quoted by Hall, says: "In importance it stands hardly second to



FIG. 3. *Fasciola magna*, Bassi.

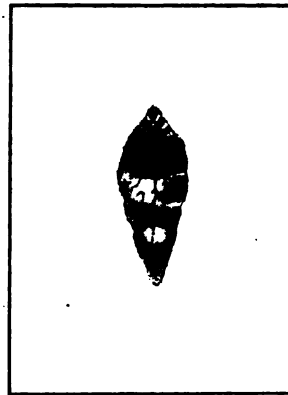


FIG. 4. *Fasciola hepatica*, Linn.

F. hepatica". The statement probably refers to domestic animals. Hall says: "Generally speaking this fluke does not seem to make the impression on the health of cattle that *F. hepatica* does on the health of sheep." "It seems to be rather rare in sheep—" Though *F. magna* is no doubt a dangerous parasite, it seems to me that with regard to farm animals it cannot be as easy for them to acquire as *F. hepatica*, otherwise our records would contain more references to it, especially in eastern America, where it has been known for many years.

MEASUREMENTS OF *F. magna*. Fourteen specimens were measured, the average length was 45.4 mm. and the width, 18.5 mm. The eggs measured 140μ in length and 100μ in width. These last measurements correspond exactly with those given by Railliet.

Fasciola hepatica. This parasite has taken its toll among the coast sheep in British Columbia ever since the early settlements began.

In some districts flockmasters have suffered considerable losses. These losses do not come anywhere near those of European countries where the percentage is much heavier. Neumann gives a mortality of 60 to 75% in some years; not in single flocks but for whole provinces. In British Columbia there are some tracts of low ground where the keeping of sheep has had to be abandoned. In other localities where it is hard to find a flock free from flukes, sheep have been kept year in and year out. Dr. Bruce, Inspector in charge of meat inspection for Vancouver tells me that practically all the sheep coming from one of the river deltas are flukey, yet sheep have been kept there for many years at a profit. It would appear from the above, that land may be lightly or heavily infested in a more or less permanent way. However, the character of the seasons undoubtedly influences the degree of infestation. It may be of interest for me to cite a case which came under my notice. Three years ago I went to see a small flock of sheep, they were badly infested and a number of animals had died. The land on which the sheep grazed was on the bank of a river. Some drainage improvements were suggested, and the owner was especially cautioned against letting his sheep graze along the river front during low water. Since that time the losses in the flocks were light, but in December, 1915 the trouble returned. The sheep at this time only numbered twenty-three, three had died. The symptoms presented were quite marked, dropsy under the jaws, puffy eyelids, dropsy of the abdomen, anaemia and emaciation in a few together with a listless expression. The owner was recommended to slaughter his flock. This was done on December 20th, and on post-mortem every liver had to be condemned, also four of the carcasses. All the animals were more or less hydraemic, but the meat set well. Fig. 5 shows a yearling with a puffy face and eyelids, on the right of the photograph an old ewe. When this animal was killed the abdomen was found to contain fully two gallons of fluid. The young animals were found more affected than the old which seem

characteristic of distomatosis. The most fatal time for the disease in British Columbia is from late December to the early part of March.

Dr. F. Torrance, Veterinary Director General, informs me that he is unaware of *F. hepatica* being found in any other part of Canada. According to Hall the same thing is true for the northern States bordering on the Atlantic; there is only one reported finding on Long Island.



FIG. 5.

Hosts for *F. hepatica* in British Columbia. In sheep kept on the low lands bordering on the Pacific. In cattle, two records, one by Dr. Bruce, one by myself. In deer, *O columbianus* recorded by Mr. Kermodé.

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The Wisconsin Veterinary Medical Association will hold its next meeting at Menominee, Wis., July 26 and 27.

The Washington State Veterinary Medical Association held a meeting at Mt. Vernon, Washington, June 21 and 22.

RECIPROCITY•

J. W. SALLADE, Auburn, Pa.

It would seem that if reciprocity could be brought about in a practical form it would cure a multitude of embarrassing things that lead to controversy in this association. If there could be devised a method by which our standards of examination and other requirements—subjects covering eligibility to our classes,—a common system of rating, uniform registration laws, equal penalties for violations, etc., covering the practice of veterinary medicine and surgery in all the states of the union; then, and only then, would it be possible to realize reciprocity with equal mutual rights or benefits, to be yielded or enjoyed between individuals so engaged throughout this wide territory, the domain of the United States.

As is well known, the regulation of the practice of veterinary medicine and surgery is a state function and every state that has undertaken the regulation of this branch of endeavor, has its own legislation creating its Board of Veterinary Medical Examiners and defining their duties, and in many instances enumerating the branches or subjects to which applicants shall submit in a theoretical and practical examination. Besides other conditions that create conflicting circumstances all of which would have to be brought into one harmonious connected whole, a uniform system of regulation.

To do all this would necessitate the repeal of all state laws now on the statute books and the re-enactment of uniform laws, a most difficult and hazardous undertaking. It must be remembered that most if not all of such legislation is secured under difficulties and in many instances is crude and unsatisfactory, yet appreciated for the recognition it affords the profession.

Frequent attempts are made in every session of the legislature to so amend these laws as to afford some constituent, otherwise barred from the fold, an opportunity to get his name on the register. The interests of such applicants are approved by legislators for political reasons and our laws are thus a subject of constant attack.

To attempt a radical change, in order to obtain uniformity is fraught with grave danger of losing rather than gaining prestige. If the attempt is ever made the line of attack must be made aggressive.

*Presented at the meeting of the Association of the Veterinary Faculties and State Examining Boards of North America, September, 1915, Oakland, Cal.

sively all along the front, in every state of the Union, in the same bill. An attack so comprehensive that it will embrace every contingency, to meet the demands, not only of the colleges but of the public and politicians as well.

State Examining Boards are limited in scope by the acts creating them. In view of this fact it would be a relief could all such bodies be made operative under a uniform law. The danger, however, of tampering with such proposed legislation renders the effort of doubtful feasibility.

SHOULD THE STATE BOARD EXAMINATIONS INCLUDE RECENT DEVELOPMENTS IN VETERINARY SCIENCE?*

A. D. KNOWLES, Missoula, Montana.

The object of State Boards of Veterinary Examiners is first, to protect the public from being imposed upon by unqualified and incompetent persons holding themselves out as veterinarians and, secondly, to maintain a standard of professional qualifications and moral respect which will give the veterinary profession a proper place and respectable standing in society.

Veterinary science is progressive and those who ally themselves with that profession must be progressively studious if they remain entitled to recognition and service therein. He who assumes upon the receipt of his diploma that he has finished his studies, that he has acquired the necessities for his lifetime in professional knowledge, will fall far short of his possibilities as a veterinarian, and his usefulness and standing among mankind is limited.

Because of the neglect of his professional qualifications, the veterinarian who follows his vocation as a business rather than as a profession must come, sooner or later, to be measured by the public as a professional degenerate and one not entitled to high and honorable standing among men.

He who has not kept strictly in touch with the developments of the science of veterinary medicine during the last decade or two

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is less qualified, and his opinion and service along veterinary lines deserves less recognition than that of the well read and intelligent farmer or the recent graduate of an agricultural college.

The veterinarian who is not familiar with recent developments in veterinary science is not acquainted with sero-diagnosis and sero-therapeutics by which many contagious and infectious diseases are now controlled and even eradicated and by which many benign diseases are successfully treated. He is not acquainted with well known vaccines which insure prophylaxis against several infectious deadly animal plagues. He is not acquainted with numerous well known microorganisms which insidiously cause diseases and animal losses which are amenable to treatment or prevention by a correct knowledge of their existence. He is not familiar with many vegetable, alkaloidal, ptomain, and leukomain poisons that are known to the science of today. He is not familiar with the well known principles of asepsis, antiseptics and disinfectants as they exist today. In fact the veterinarian who has not been a student during the past ten years has no correct knowledge of the wonderful developments which have been produced by the pathological, chemical, biological, bio-chemic, and botanical laboratories, and he is surely not entitled to the professional dignity and respect that belongs to the veterinary profession of the present time.

Following this discussion, it is needless for me to state that the answer to the title of this paper should be in the affirmative. There can be no argument in the negative unless it should be considered that veterinarians who graduated ten or more years ago have not had the opportunities to acquire the knowledge of the *Recent Developments of Veterinary Science*. This consideration, however, deserves no attention when we consider the advantage of keeping abreast of the times through our splendid veterinary journals, the many splendid bulletins published by the various departments of the United States Department of Agriculture, by the various state experiment stations, by the various State Veterinary Medical Associations, and by our own A. V. M. A. with a fund of up-to-date reports as published in the annual proceedings. There are also the ever new and increasing text books full of recent development of veterinary science, and the newer and better systems of learning about the science previous to the newer developments.

My experience on the State Board of Veterinary Examiners has been that veterinarians who have been in practice for seven

years, for the most part, pass better examinations than the recent graduate, or at least the graduate just from college without having had the advantage of actual practice; and this seems to me to be perfectly natural. This must be true, because the practitioner should lose nothing of what he has gained during his college career and, if he is doing justice to himself, he will have been adding to that knowledge every day and year he is in practice.

In my opinion, the state board that does not include recent developments in veterinary science in its examinations does not do justice to the state which it serves, and it certainly does a gross injustice to the public which looks to it for protection against incompetent veterinarians.

DIPHTHERIA FROM CATS. An outbreak of diphtheria in an orphanage has been traced to cats. Sixty-nine cases, which were the great majority of those which occurred, came from the boys' house. After many investigations and precautions, such factors in the production of the disease as sanitary defects, contaminated water supply and food were eliminated. Realizing that there must be some carrier of the bacillus, the physician in charge decided to turn his attention to the cats, and took swabs from all of their throats. On bacteriologic examination it was found that the four cats from the boys' side of the orphanage were suffering from diphtheria; the four cats from the girls' side, although showing other microorganisms in profusion, did not prove to have the true diphtheria bacillus. The cats were destroyed, and after that only ten more cases of diphtheria occurred. They occurred within a few days, showing the patients had already been infected when the cats were destroyed. There have been no more cases since.—*London Letter, Jour. A. M. A.*

The seventh annual meeting of the Central New York Veterinary Medical Association was held at Syracuse, June 29. In the forenoon a clinic was held at the infirmary of Dr. Turner. In the afternoon papers were presented by Drs. Stevens, Tuxill, J. A. Pendergast, and Danforth.

CLINICAL AND CASE REPORTS

ROUND-CELLED SARCOMA IN THE HEART OF A DOG*

W. REID BLAIR, D.V.Sc., New York, N. Y.

During the latter part of October, 1914, I was asked to examine an aged Boston Bull terrier, owned by Dr. B., a surgeon connected with the Post Graduate Hospital. I found a very fat asthmatic dog suffering from bronchitis, with chronic cough, and with a very hard wiry pulse, and distinct heart murmurs, induced by leaky heart valves.

The animal was at this time about twelve years old, very active, and until a few weeks before had rarely been ill. As the asthmatic symptoms and chronic cough were doubtless due to the cardiac condition, I prescribed tr. strophanthus three times daily in doses of four drops. This drug produced a very laxative effect on the bowels, and as the bowel condition did not improve after a few days this drug was discontinued and tr. digitalis substituted, in three drop doses. After four days of this treatment improvement was noted in the asthmatic symptoms, and the cough became less frequent and distressing. As the animal's food had for many years been made up of bread, milk, rice and vegetables, I changed the diet to one of meat, with the result that while the dog lost some fat, he showed great improvement in health and spirits. The treatment of the heart was continued at frequent intervals for fourteen months, but although I did not see the dog from October, 1914, till January 1st, 1916, I had, however, been kept informed as to his condition.

The owner asked me to come again January 1, 1916 and I now found the dog not greatly changed in physical condition, perhaps slightly thinner, but with distressed breathing, and an almost constant racking cough, and considerable congestion of the larynx. I suggested codein 1/6 grain every five hours, also pertussin was used. These drugs had no appreciable effect on the cough. The animal's appetite was good, and he was always eager for his food.

The heart pulsations were hard and irregularly intermittent, the lungs congested. We could detect a large area of dullness at the upper and anterior part of the lungs on the left side. I suspected

*Presented at the meeting of the Veterinary Medical Association of New York City, March, 1916.

a case of tuberculosis, and after detecting a nodule on the border of the liver, this opinion was strengthened. However, I was not able to positively convince myself, since in the absence of anemia, emaciation, weakness, ascites, and intermittent fever, tuberculosis, in my experience, has been a rare condition. I then considered sarcoma of the lungs and finally convinced Dr. and Mrs. B. that the dog was suffering from either tuberculosis or sarcoma, and that there was no hope of relief, after which they reluctantly consented to have the dog destroyed.

This was done on January 7th, 1916 and the post-mortem examination was made immediately afterward, the owner, Dr. B., being present.

The following gross conditions were present:—

Upon opening the thoracic cavity a tumor mass of globular form was found firmly adherent to the superior auricular borders of the heart. This tumor, about $4\frac{1}{2}$ inches in diameter, was also attached quite firmly to the trachea and esophagus, and surrounded the pulmonary veins. The heart was greatly hypertrophied, the ventricles were dilated, and the auriculo-ventricular valves showed extensive vegetation and imperfect closure.

The lungs were congested, and showed the production of fibrous tissue as a result of chronic bronchitis, and an excessive amount of pigmentation was present throughout.

The liver was enlarged and congested. A nodule, 2 inches by $1\frac{1}{2}$ inches, of dark brown color and of firm consistency, was found on the posterior border of the left lateral lobe.

The kidneys showed chronic congestion, and the capsules adherent in several places. Other organs showed no gross changes. Sections of the tumor mass of the heart were taken for pathological histology examination by Dr. B., and later the microscopic examination of the section showed the tumor to be a *small round-celled sarcoma*, the most malignant of the sarcomata. The section of the liver nodule showed this to be an hemorrhagic infarction, with considerable fibrous connective tissue.

In this connection, it may be of interest to consider some common characteristics of these new growths described as sarcomata.

A sarcoma is a more or less malignant tumor consisting of cells similar to those of embryonal connective tissues. From the beginning of the growth of a sarcoma, a certain type of round or spindle-

cell structure persists, the cells not transforming to more highly developed tissue.

The type of sarcoma varies greatly; certain forms are made up of round cells; others of spindle cells; others of spindle cells and fibres.

The sarcomata are composed essentially of cells, between which a small amount of intercellular substance, usually of a fibrillar form, is present. As a rule, this intercellular tissue is comparatively insignificant, and is seen with difficulty. Sarcoma grows chiefly by interstitial expansion, though a certain amount of peripheral infiltration is characteristic of the more malignant forms. Though sometimes appearing to be encapsulated, the tumor is not always sharply circumscribed from the surrounding tissues.

Sarcomata are usually poorly supplied with blood vessels. The circulation of the tumor is peculiar and irregular. Not only are the blood vessels few, but in many cases those present are imperfect in structure, consisting of an endothelial coat with a few supporting connective-tissue fibres.

Considerable parts of the tumor may be without blood vessels, but contain sinuses or clefts through which the blood circulates in intimate contact with the tumor cells.

Sarcomata may appear in any tissue or organ of the body. A few observers have claimed to find in and among the cells of the tumor certain parasitic protozoa, but nothing definite is known of the nature of these bodies. Many cases appear to follow traumatic injury, but the majority arise independently of any recognizable cause. Sarcomata usually occur as rounded, more or less lobulated tumors. Upon section they are usually pinkish grey in color. The sarcomata vary through all degrees of malignancy. Some are rapidly fatal; others liable to recur after excision. Soft, moist tumors are more apt to be malignant than firmer and more fibrous ones. The general tendency of all the sarcomata is to recur, and the majority produce secondary growths by metastasis. The round cell type most frequently recur through metastasis. Metastasis takes place almost exclusively through the blood channels, and is most rapid when the blood circulates in indefinite spaces in the tumor mass and is free to detach and transport the cells to other parts of the body.

AN UNUSUAL MILK FEVER CASE

M. H. REYNOLDS, University Farm, St. Paul, Minn.

A very valuable imported Guernsey calf, calved about three months previous, was being fed for a milk record. She showed symptoms suggestive of milk fever on the morning of June 14th. When seen by the writer at about 8:30 o'clock a. m., her temperature was 99.8; pulse about 60, and weak; respirations very shallow. No feces were passed during the night. Milk flow had been greatly and suddenly reduced.

This cow rapidly developed typical symptoms of milk fever. She was lying in the usual position with a tendency to hold the head with a peculiar curve in the neck or around the flank in the usual position. Skin sensation was entirely lost and there was only a rather slow response at the eyes which had a peculiar glassy stare.

On trial with plain water it was found that the cow swallowed easily and a dose of linseed oil, turpentine, and aromatic ammonia, was given about 9 a. m. The udder was inflated about 9:30. The cow made a steady improvement following the air treatment. A mild catharsis developed in the latter part of the afternoon. On the morning of June 15th the cow was quite comfortable and in good condition. Uneventful recovery followed.

BOTRYOMYCOSIS*

R. W. GANNETT, Brooklyn, N. Y.

Botryomycosis is defined by Hutyra and Marek as a chronic infectious disease of horses which may, in exceptional instances, occur in cattle. It usually results in the formation of local tumors resembling fibromata and occasionally in the formation of metastasis in the internal organs. It is caused by the botryomyces fungus.

The infectious new growth caused by this fungus is known as a botryomycoma or mycofibroma. It is a neoplasm that occurs very frequently in the horse. It is often malignant in character. Its most common occurrence is in the form of the schirrous cord in the gelding and the cold or deep seated abscess of the levator humeri muscle at the point of the shoulder of the draft horse. It occurs less

*Presented at the February meeting of the Veterinary Medical Association of New York City.

commonly in the pectoral region, at the elbow, skin or subcutem in any part of the body, udder, nasal mucous membrane and rarely in bones. Like actinomycosis it is a wound infection disease but metastasis though it often occurs seems to be less common than in the so called lumpy jaw of cattle.

Botryomycomata have been observed in swine and recently in man.

BACTERIOLOGY. Formerly the botryomyces fungus and the staphylococcus pyogenes aureus were thought to be identical, but more recent investigations seem to disprove this idea.

The staphylococcus according to investigators quoted by Hutyra and Marek and also by Fröhner forms goldish yellow cultures at any temperature. The botryomyces fungus grows only at a temperature of 18° Centigrade. They are alike in form, take the same stain and have the same grape-like arrangement in clusters. Their development on gelatin is not the same and blood from rabbits immunized with staphylococcus failed to agglutinate the botryomyces fungus. The botryomyces organism possesses pyogenic properties but it also causes chronic productive inflammation of connective tissue experimentally, a property which is not possessed by the staphylococcus.

BOTRYOMYCOMA OF THE SPERMATIC CORD. Most cases of scirrhous cord may be regarded as due to the botryomyces fungus. Infection no doubt takes place at the time of castration. A hard tumor appears sometimes at once but often months or even years after the testicles have been removed. Adhesion takes place between the stump of the spermatic cord and the tunica vaginalis. Growth is gradual. There may or may not be a purulent discharge. Sometimes the growth assumes a malignant character and involves the sheath skin of the scrotum, thigh or abdomen. The cut surface shows numerous purulent or muco-purulent areas and also the smaller yellowish sand like foci of infection.

BOYTRYOMYCOMA AT THE SHOULDER. Botryomycoma involving the levator humeri at the point of the shoulder is commonly called cold abscess or shoulder abscess. Its appearance is often sudden and may in many cases be attributed in part to contusion from the collar. After the initial acute inflammation has subsided, growth is gradual but continuous. If neglected the enlargement may become enormous and incurable by involving the carotid artery and jugular vein. It may even extend to the periosteum of the scapula and

humerus. A botryomycoma in this region seldom if ever fluctuates. It rarely or never recovers permanently without surgical interference. It is apt to recur if strenuous measures are not taken to destroy the organism which is its cause.

European writers have recorded cases of generalized botryomycosis affecting such organs as the lungs, kidneys, diaphragm, spleen and liver. Most of them were horses which had schirrous cord.

TREATMENT OF SCHIRROUS CORD. Treatment is entirely surgical. The patient should be secured in a recumbent position and anesthetized. The entire schirrous cord should be removed by dissecting well into healthy tissue. The emasculator or ecraseur may be used to divide the spermatic cord. If any of the neighboring skin or subcutaneous connective tissue is involved this too must be removed. Hemorrhage is sometimes troublesome.

In operating upon cold abscess at the shoulder local anesthesia is sufficient. A single bold vertical incision is made down to the central pus cavity. Often there are two or more pus cavities which may or may not communicate. *It is never safe to rely upon ordinary antiseptics for disinfection; either slough out the diseased fibrous tissue with an escharotic or sear thoroughly with the actual cautery.* Botryomycomata in other parts of the body should be operated upon by total extirpation or vertical incision methods, according as they resemble the type represented by the schirrous cord or the cold abscess at the shoulder.

CASE REPORTS. A gray draft mare was presented with an enormous botryomycoma involving the entire pectoral region. The growth had become so large that the collar could not touch the point of either shoulder. There were several discharging seton wounds as well as scars from both line and point firing. The growth was completely removed in three separate operations with the aid of stocks and local anaesthesia. Hemorrhage was severe. The structure of the tumor resembled that of the schirrous cord. Cicatrization required six weeks. The mare has been working two years and there is no sign of recurrence of the condition.

A five year old draft gelding in poor condition was operated upon for schirrous cord. He had been passed as sound by me six months previously and at that time showed no enlargement at the scrotum. Shortly after the operation two round fibrous tumor like growths appeared just above the hock of the affected side. They were incised, contained pus, were cauterized and healed promptly.

Soon fibrous nodules of various sizes appeared at the shoulder, all contained pus but healed under treatment. The animal carried a slight temperature at times. He was mallein tested repeatedly but never gave a reaction. About six months after the schirrous cord operation he was in very poor condition, limbs stocked, staring coat, appetite poor and unable to do steady work. Rest, arsenic, nux vomica and poly-bacterins did not improve his condition. While under treatment a fluctuating abscess of the groin of the affected side appeared. It was lanced, contained foul smelling pus and the wound healed properly but for several months the animal remained in very poor condition, worked half time and had the appearance of a worn out, debilitated old horse. He is now (two years after the operation) in good health and good general condition.

A roan draft gelding was operated upon for a large deep seated cold abscess back of the right shoulder blade. The condition had been noticed for several months. A single vertical incision about eight inches long was made. Ordinary antiseptics were used and the wound healed in about six weeks. The animal was sent home, went to work and in ten days an enormous cold abscess appeared on the opposite side at the point of the shoulder. The owner became discouraged and disposed of the horse.

A bay horse was presented with a large botryomycotic growth involving the skin and subcutem of the left shoulder, withers and side of the neck and of the chest back of the left elbow. There were several discharging fistulous tracts. He was considered incurable and was not treated.

A black gelding showed two round botryomycomata of the skin of the shoulder as large as English walnuts. They were incised and contained muco-purulent material. The cavity was disinfected and packed with cotton saturated in tincture of iodine. Healing took place but soon more growths appeared. I lanced at least twenty small botryomycotic abscesses in two months and eventually was obliged to remove a section of diseased skin and sub-cutem five inches square. The wound was cauterized with the red hot iron and normal healing took place. A tumor as large as a hen's egg soon appeared on the opposite side about half way from the point of the shoulder, to the withers. This was incised, contained pus, the wound was cauterized and healed normally. The horse finally went to work, but the entire treatment had taken between three and four months.

A bay ten year old gelding was operated upon for a cold abscess of the left shoulder of two months' duration. A single vertical incision was made into the pus cavity. No escharotic or actual cautery was used but the wound was treated with ordinary antiseptics. The wound continued to discharge slightly for some time and never healed properly though the animal was put to work.

Four months later I was called to see a large botryomycotic tumor on the right branch of the lower jaw of this horse. There were two small ulcers discharging a non-smelling pus. On examination the third lower molar of the affected side was found to be loose. The animal was placed upon the operating table and anesthetized. The tumor was cut away. Its structure resembled that of the schirrous cord in that there were numerous areas of purulent liquefaction and also the small gritty foci of infection. Several pieces of loose bone were removed. The tooth was punched out but was odorless and showed no visible lesion. The old fistula at the point of the shoulder was opened. The botryomycotic fibrous tissue was thoroughly cauterized with the actual cautery. Convalescence was uneventful and there has been no recurrence of botryomycomata after eighteen months at work.

These case reports have been selected with the view of illustrating metastasis and malignancy in botryomycosis and particularly to emphasize the fact that drainage and ordinary antiseptics are not to be relied upon but must be supplanted by the actual cautery, powerful escharotics or total extirpation of the infectious new growth.

REFERENCES

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FRÖHNER'S GENERAL VETERINARY SURGERY—UDALL.
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CADIOT'S CLINICAL VETERINARY MEDICINE AND SURGERY—DOLLAR.

The joint meeting of the California State Veterinary Medical Association and its Southern Auxiliary was held at Los Angeles, Cal., June 21 and 22. Those participating in the program were Doctors Archibald, Iverson, Meyer, Thompson, Wood, Hurt, Donnelly, Boucher, Irons and Beach.

ABSTRACTS FROM RECENT LITERATURE

URETHRAL OBSTRUCTION IN A FOAL. C. W. Cartwright, M.R.C. V.S. *Veterinary Record*.—A five weeks old valuable Shire foal was making unsuccessful efforts to urinate. On examination an obstruction was indistinctly felt in the urethra above the scrotum. With a large sized dog catheter, attempts were made to dislodge it. Several trials were useless, only material of a cheesy consistency was left at the end of the instrument. Objections were made by the owner to an operation which was suggested. The use of the catheter was again resorted to and after a while, by persevering, the instrument was felt to pass the obstruction and about half a pint of urine escaped. The flow stopped as soon as the instrument was withdrawn. With directions of careful catheterism being renewed, the foal was left for the night. The next morning he was seen in great pain, which was rapidly increasing. The bladder was evidently distended to the bursting point and immediate relief was necessary. Urethrotomy was performed at once. A gush of urine escaped; the foal made great effort and suddenly the flow ceased, the bladder had ruptured. The little fellow died shortly afterwards. At the post mortem, there was found a calculus of cheesy consistency, about the size and shape of a pigeon's egg, which was firmly lodged in the urethra. The bladder was empty with a large laceration, the mucosa being covered with thick mucous deposits. There was also slight nephritis. All the other organs were healthy. A. LIAUTARD.

THE USE OF INTRAVENOUS INJECTIONS OF CAMPHOR. E. Fischel *Recueil de Médecine Vétérinaire*, Vol. 92, p. 99, 1916. For affections of the respiratory tract, contagious or otherwise; intravenous injection of a solution prepared as follows, is recommended. Dissolve 8 grams of sodium chloride in 1 liter of water and sterilize by boiling. Add drop by drop, a saturated alcoholic solution of camphor, until a white flocculent precipitate appears. Filter. The dose for a horse varies from 0.9 to 1.5 liters according to the size of animal. The injection should take 5 or 6 minutes, and should be repeated in grave cases after 12 or 24 hours. There is a violent short reaction (excitation). The entire treatment consists of 2 to 6 injections, according to the gravity of the disease.

This seems to be a medication having the properties of nevarsan—but infinitely less severe. It is being experimented with several other infectious diseases.

BERG.

SUPPURATIVE ARTHRITIS OF THE HOCK—RECOVERY WITH BIER'S METHOD. Roy Student and Veter. Dupuy. *Presse Veter.* The horse "Souris" had received a punctured wound on the internal face of the left hock. He was very lame and in three or four days had all the symptoms of suppurative arthritis of the injured hock. The local and general symptoms were characteristic and alarming and as the case was at the front of the battle, with frightful atmospheric conditions of rain, mud, snow, ice, etc., recovery seemed almost impossible and the horse was condemned to be destroyed. Before doing it, however, Bier's method was attempted. A rubber band, such as used in human surgery, for hemostasis and a fine cotton roller, slightly extensive were used and applied one on the top of the other above the hock of the injured leg, the rubber band first as it was rather short and the cotton over it to complete the action of the other. This apparatus was to be left on six hours. The careful description of the case which showed a gradual improvement brought the writer to the conclusion that after thirteen days of treatment, this suppurative arthritis of the hock, rarely amenable to favorable results, was cured by the application of Bier's method.

LIAUTARD.

EPITHELIOSIS INFECTIOSA AVIUM, CONTAGIOUS EPITHELIOMA, CHICKEN POX, DIPHThERIA, ROUP, CANKER. O. V. Brumley and J. H. Snook. *The Veterinary Alumni Quarterly, Ohio State University, Vol III (1916), p. 81.*—A large number of birds were presented at the clinic of the Ohio State University for treatment. An autogenic bacterin was prepared from cultures made from the lesions and used as a curative agent. This proved satisfactory while other methods of treatment proved very unsatisfactory. As a result of this method of treatment a series of experiments were undertaken to determine the etiology of the disease and the value of the bacterin as a method of control. As a result of these experiments which are reported in detail, the authors arrived at the following conclusions:

"1. From the bacteriological experiments we have made and the good results obtained from vaccination, we are of the opinion that we have been dealing with one disease only. Owing to the confusion in names which have been used to designate this disease, we have concluded to give it a new name—Infectious epitheliosis of birds (*Epitheliosis infectiosa avium*.) This indicates involvement

of the epithelium both of the skin and mucous membranes. It was thought that inasmuch as we find so many variable forms of the disease that this name would be more appropriate than any combination of names so far suggested.

"2. Our work extending over a period of six years convinces us that typical infectious epitheliosis is due to a combination of two factors: (a) filterable virus; (b) secondary invading organisms which vary in kind but of which the so-called '*Bacillus diphtherae columbarum*' of Loeffler, appears to be the most important.

"3. The filterable virus is the necessary primary invader which lowers the birds' resistance and thus prepares the tissues for invasion by the secondary organisms. Neither factor alone will cause the typical disease.

"4. The excellent results derived from the use of a vaccine made from the secondary organisms, both in prevention and treatment, are due to controlling the secondary infections which cause the serious complications. If these are controlled, infection due to the primary virus is mild and soon disappears. (There is a remote possibility that the filterable virus is contained in the vaccine. We have no evidence that this is or is not the case. The presence of the virus in the vaccine would indicate its growth with the other organisms on the cultures. This would be contrary to our present knowledge of filterable viruses. This point will be investigated.)

"5. The therapeutic dose, as indicated by the large number of birds treated, is 1 c.c. for the average adult bird. Younger and smaller birds receive a lesser amount.

"6. The immunizing dose found most satisfactory is 1 c.c.

"7. No bad results have followed when larger doses have been administered.

"8. Reports received to date indicate that vaccination is equally efficacious in the treatment of infectious epitheliosis in turkeys."

C. P. FITCH.

SULPHUR POISONING. H. D. Jones, M.R.C.V.S. *Veterinary Record*.—Seven pounds of sulphur were found missing from a bag. It had been given indiscriminately to some 13 horses to cure mange. When seen by the writer eleven had abdominal pains. Two had already died. The pains were not acute; there was a paddling of the legs, a constant looking around at both flanks. The temperature varied: 104° in some, 101°, 102° in others. The mucous membranes

were pale. Two animals died while the writer was there and the post-mortem revealed a strong smell of sulphuretted hydrogen. There was severe gastro-enteritis; the heart and lungs were ecchymotic. A large amount of sulphur was found in the cecum. In two stomachs the amount contained was estimated to be 8 ounces in one and 30 in the other. The treatment was to have all the animals rugged up with blankets and bandaged, friction to the skin, stimulants, whiskey, strychnine, linseed gruel, etc. None of the animals refused food until shortly before death.

Results: Thirteen animals were affected and seven died.

LIAUTARD.

A CONTRIBUTION TO THE STUDIES OF RABIES IN CATTLE. Borellini, Alberto (Brisighella), Contributo allo studio della rabbia nei bovini, (II Moderno Zooiatro, 1914, p. 141). Abstracted by Ascoli (Mailand) *Zeit für Immunitätsforschung*, No. 12, March 1, 1916, p. 567.—Borellini cites several cases of rabies in cattle in which the entire course of the disease was marked by the absence of violent symptoms, and by the presence of paralysis of the hind quarters. The infection was apparently taken up by the animals from a well in which a rabid dog had fallen but a short time before. The diagnosis in one case was confirmed by microscopic examination, and in other cases by animal inoculation.

REICHEL.

THE PRESERVATION OF LIVING RED BLOOD CELLS IN VITRO. Peyton Rous, M.D. and J. R. Turner, M.D. (From the Laboratories of The Rockefeller Institute for Medical Research). *Jour. of Exp. Med.*, Vol. XXIII, No. 2, Feb. 1, 1916, p. 219.—SUMMARY. The erythrocytes of some species are much damaged when handled in salt solutions, as in washing with the centrifuge after the ordinary method. The injury is mechanical in character. It may express itself in hemolysis only after the cells have been kept for some days. It is greatest in the case of dog corpuscles, and well marked with sheep and rabbit cells. The fragility of the red cells, as indicated by washing or shaking them in salt solution is different, not only for different species, but for different individuals. It varies independently of the resistance to hypotonic solutions.

The protection of fragile erythrocytes during washing is essential if they are to be preserved *in vitro* for any considerable time. The addition of a little gelatin ($\frac{1}{8}$ per cent) to the wash fluid suf-

fices for this purpose, and by its use the period of survival in salt solutions of washed rabbit, sheep and dog cells is greatly prolonged. Plasma, like gelatin, has marked protective properties.

Though gelatin acts as a protective for red cells it is not preservative of them in the real sense. Cells do not last longer when it is added to the fluids in which they are kept. Locke's solution, though better probably than Ringer's solution, or a sodium chloride solution, as a medium in which to keep red cells, is ultimately harmful. The addition of innocuous colloids does not improve it. But the sugars, especially dextrose and saccharose, have a remarkable power to prevent its injurious action, and they possess, in addition, preservative qualities. Cells washed in gelatin—Locke's and placed in a mixture of Locke's solution with an isotonic, watery solution of a sugar remain intact for a long time,—nearly 2 months in the case of sheep cells. The kept cells go easily into suspension free of clumps, they pass readily through paper filters, take up and give off oxygen, and when used for the Wassermann reaction behave exactly as do fresh cells of the same individual. The best preservation solutions are approximately isotonic with the blood serum. If the cells are to be much handled gelatin should be present, for the sugars do not protect against mechanical injury.

Different preservative mixtures are required for the cells of different species. Dog cells last longest in fluids containing dextrin as well as sugar. The mixture best for red cells is not necessarily best for leukocytes.

A simple and practical method of keeping rabbit and human erythrocytes is in citrated whole blood to which sugar solution is added. In citrated blood, as such, human red cells tend to break down rather rapidly, no matter what the proportion of citrate. Hemolysis is well marked after a little more than a week, but in a mixture of 3 parts of human, 2 parts of isotonic citrate solution (3.8 per cent sodium citrate in water), and 5 parts of isotonic dextrose solution (5.4 per cent dextrose in water), the cells remain intact for about 4 weeks. Rabbit red cells can be kept for more than 3 weeks in citrated blood; and the addition of sugar lengthens the preservation only a little. The results differ strikingly with the amount of citrate employed. Hemolysis occurs relatively early when the smallest quantity is used that will prevent clotting. The optimum mixture has 3 parts of rabbit blood to 2 of isotonic citrate solution.

M. J. HARRIS.

TWIST WITH UNUSUAL SYMPTOMS. A.V.O. in France. *Veterinary Record*.—This mare had been ridden fifteen miles and brought home without having shown anything unusual. After being in the stable five minutes, she was seen crouching as if preferring to lie down and was slightly tympanitic. She was taken out and walked around. She did not seem to be in much pain but the tympanitis became so severe that her breathing was rendered very difficult. The pulse was hard and quick. Temperature 101°F. She lay down, but did not attempt to roll. While preparations were made to tap her, the tympanitis subsided and no interference was necessary. There was no improvement otherwise, the pulse became weaker, it could hardly be felt, the mucous membranes were injected. Occasionally the mare gulped but there was no attempt to vomit. In the evening, she dropped dead after an illness of five hours. The usual treatment for colic had no effect. The postmortem revealed a twist in about the middle portion of the small intestine. Except at the actual twist there was very little inflammation. There was also a rupture of the mesentery through which the twist had passed. The entire absence of any symptoms of pain, the extreme tympany and the continual regurgitation made the record of the case interesting.

LIAUTARD.

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CARCINOMA OF THE ADRENAL GLAND IN THE HORSE, WITH HEMORRHAGE INTO THE ABDOMINAL CAVITY. E. Fröhner. *Monatshefte für praktische Tierheilkunde*, Vol. 27, p. 102, 1916.—As is well known, diseases, especially tumors of the adrenals occur not infrequently in man (Addison's Disease, Bronze Disease). According to the recent investigations of Fölger, Horne and others, pathological anatomical changes in the adrenals in domesticated animals are just as frequent. This is especially true of tumors of the adrenals. Fölger (on the pathology of the adrenals in domesticated animals; his *Monatshefte*, Vol. 20, p. 165, 1909) found 46 adrenal tumors in 100 horses, and 9 in 200 dogs. I have met no cases of adrenal diseases in animals; for this reason the following case of adrenal carcinoma, leading to internal hemorrhage into the abdominal cavity is worthy of notice.

An extremely unsound and decrepit horse was suffering with impaction colic and was treated accordingly. Five hours after arrival there was a sudden general depression, extreme heart weakness, staggering, and death with symptoms of internal hemorrhage.

Autopsy showed as the cause of death, a tumor twice the size of a man's head, next to the left kidney, with a 3 cm. tear in its anterior end out of which blood clots poured. In the abdominal cavity there were 12 liters of fluid blood, in the omental cavity there were six fresh blood clots each as large as a fist. On cutting the tumor, it was seen to consist of grayish yellow tissue, alternated with blood clots. Part of the tumor wall was formed by the cortical layer of the left adrenal. Microscopical examination showed the presence of a carcinoma.

BERG.

LIVER FLUKE DISEASE, ITS TREATMENT AND CONTROL. J. Marek. *Berl. Tierarztl. Wochenschr.*, 1916, v. 32 (7) 17. Feb., pp. 73-77; (8), 24. Feb., pp. 85-90; (9), 2. März, pp. 97-101—Marek has made a number of tests of substances of a bactericidal and parasiticial nature, which are believed to be taken up by the intestine and returned in the bile, the following substances being tested: quinine hydrochloride, arsenic, chloroform, trypanblau, benzoic acid, helminthol, urotropin, menthol and thymol. All the above were administered in appropriate doses to steers or to sheep infested with liver fluke, and in all cases the flukes were found to survive the treatment.

Better results were obtained with male fern preparations. Filmaron (aspidinofilizin, an active principle of the ethereal extract of male fern), intravenously, into liver, etc., even when repeated for a total of 400 c.c., was found ineffective for steers in 100 c.c. doses of 1 per cent solution, but 50 c.c. doses of the 5 per cent solution intravenously one day, followed by 75 c.c. the next day, and 100 c.c. each day for the next three days appears to be rather effective against *Fasciola hepatica*, killing the larger number and leaving only a few individuals. Neither this preparation nor anything else was effective against *Dicrocoelium*, the small lancet fluke. French and Hungarian extract of male fern and a German male fern preparation called Fasciolin were tested on a series of experiment cattle and sheep to the number of 47 including the controls. These preparations were found ineffective against *F. hepatica* in cattle even in large doses, while in sheep they were unsatisfactory, killing some or all of the flukes in only part of the sheep treated.

A really satisfactory line of treatment was found in the use of kamala and its preparations. A preparation called Calbazan was found to have too little kamala for satisfactory results, but one called Parasiten was found satisfactory, as was kamala itself.

Marek states that a successful treatment for fluke disease has been demonstrated beyond question. By large doses of kamala all flukes can be removed from 85 per cent and a large proportion from 15 per cent of all patients. Either kamala depuratum or kamala venale is satisfactory. Yearlings and older sheep may be given 15 grams divided into two doses and given at 12 to 24 hour intervals. The entire 15 grams may be given in one dose to strong animals or it may be divided into 5 doses for weak ones. After treatment sheep are dull for 3 to 5 days, they lie down a great deal, eat little or may stop eating for a day or two, and have a diarrhea. The flukes die in from 3 to 8 days; the fluke eggs usually continuing to pass out until towards the close of the period. In cattle the results of treatment with kamala are beneficial but not so satisfactory as in the case of sheep; the dose used was 0.139 and 0.26 grams per kilo of weight of patient. Compared with kamala, male fern is less effective, more toxic, two to ten times as expensive, and of no value in the case of cattle. Male fern should be given to yearling sheep in doses of 5 grams a day for 6 days; for older sheep give 6 grams a day for 6 days; give in double this amount of some neutral oil.

Marek suggested the following plan for eradicating flukes from a farm: Treat all sheep and cattle at the beginning of stable life in the winter; for the next two weeks take all manure to a special place and cover with thick layers of manure from other animals to kill the eggs by rotting, or spread the manure on dry fields; repeat the treatment before putting the animals on pasture in the spring; if any animal shows signs of fluke disease put it up and treat as noted; if new stock is purchased, have the feces examined microscopically to determine the presence or absence of flukes.

M. C. HALL.

DIAPHRAGMATIC RUPTURE IN DOGS. Harold Stanton, M.R.C. V.S. *Veterinary Journal*. 1st case. *From self-inflicted injuries*. Pomeranian, fourteen months old, was accustomed to jumping into the air at the instigation of his owner. In his last jump, he fell on the leg of a bedstead. He exhibited pains, appeared dull and got a dose of castor oil. Next day he refused food and began to vomit. Breathing was stertorous, and jerky. Auscultation revealed nothing on the right side but on the left there were exaggerated heart-beats and a peculiar gushing sound. Thirty-two hours after the accident the dog died. He showed at post-mortem a rupture of the dia-

phragm with the stomach, spleen and a portion of the small intestines in the left side of the thorax.

2nd case. *From External Violence.* Aberdeen terrier, 14 years old, was found in the gutter, collapsed and in great pain. He showed severe bruising of the ribs and left fore leg. After being eight days under treatment, he suddenly began to vomit, had labored breathing and died in an hour. At post-mortem there was found a ruptured diaphragm with the anterior portion of the stomach in the thorax.

3rd case. *Congenital.* A fifteen months' old Irish terrier had the following history: always with her owner and had never met with an accident. During his life his breathing had been peculiar, and he was breathless after a short run. He had a big appetite and his abdomen was much distended after a meal. He had pain sometimes. He would cough especially after feeding. Lately had fits of choking. It was while in one of these that he was observed to be gasping for breath and died.

Post-mortem: two floating kidneys. Stomach, intestines, spleen, pancreas and liver in the thorax. Stomach adherent to the diaphragm. Heart situated on the right side. Right lung half its normal size.

LIAUTARD.

CONCERNING THE PFEILER PROPOSAL FOR THE COMBATING OF GLANDERS IN THE FIELD BY IMMUNIZATION. Dr. B. Schubert, Münster, i. W. *Copied from Berl. Tier. Woch. No. 30, July 29, 1915.* The earnest desire on my part to carry to victory a matter which according to my convictions was a worthy one, persuaded me—inasmuch as I am, on account of my official capacity in the glanders division of the Veterinary Biological Institute in Münster, i. W., a logical representative of the established methods for combating glanders,—to lay aside for once my induced and self-imposed reservedness and to take up a position with regard to the immunization against glanders in horses which while not new in itself is based on new standpoints with special insight into questions which have recently been brought forward.

If one obtains the very essence of the article which appeared in No. 28 of this periodical by W. Pfeiler on "A Proposal for Combating Glanders in the Field by Immunization" a prospect is arrived at which is certain to obtain the earnest consideration of specialists because he (the author) points to a practical way to attain the goal

which hovers before all those who have at heart the retention of the utility of our cavalry horses, namely the rapid freeing of the mobile and permanent horse depots from the danger of considerable losses through glanders. Whether one recognizes the grounds on which Pfeiler premises his proposal, as sound or unsound—granted that a complete eradication of glanders by malleinisation and serological examination is impossible, a concession to which I cannot agree from my own experience, and which would not be a convincing inducement, in the face of the present day standing of the disease of glanders, to take up other means of combating the disease which have not yet been proven trustworthy. The essential part of the proposal, vaccination of the animals threatened and also whenever possible the mobile cavalry depots similar to cholera and typhus vaccination, appears to me to be the true method and worthy of the warmest recommendation. The unavoidable contact of healthy horses with glanders infected animals which occurs under the extraordinary present state of affairs and which may be prolonged would be made truly non-dangerous or at least the danger would be considerably minimized.

The mallein ophthalmic test and the blood examination by means of agglutination and complement fixation can give in single cases as is most convincingly the case here in the West just as good a result, nevertheless the system involved leads very slowly to the point of freeing horse depots from the disease.

The distinct advantage of the process proposed by Pfeiler lies in the quick removal or diminution of the danger of infection—provided that the vaccination is carried out *en gros*. For, everything depends on the conservation of every single available horse. On this account the elimination of the horses sick with glanders to which principle of course Pfeiler naturally adheres, is indeed not more important than the protection from fresh infection even if it is not absolute and only relative.

It is not to be overlooked that the prevention of isolated formations through vaccination would be far less serious than in the case of the previous method where a quarantine of a week in the depots and forages is hardly avoidable.

A single diagnostic examination and simultaneously, with the removal of horses thereby recognized as sick, a vaccination of all the others left over would be sufficient to put a large depot in a position to move out. Should isolated cases transpire later, these can

be sorted out without danger to the healthy horses, the men also being vaccinated, which can also be done without danger.

That which Pfeiler outlines with regard to the application of diagnostic methods to the vaccinated horse I also subscribe to unreservedly. Even if the experiments instituted by him in this direction do not give any definite results, the expert would soon become practiced in sero-diagnosis or judgment of the mallein test even with altered and aggravated preliminary conditions, the inclusion of which according to my opinion is certainly demanded by the situation.

Apart from the material considerations which appear to make the immunization process in glanders possible throughout, none would deny high recognition of the act which Pfeiler has concluded in bringing his proposal into publicity. The effort that it must have cost such a vigorous and successful student and exponent of the hitherto existing "Nothing-less-than-elimination" methods to enter into the field of immunization publicly can only be most keenly understood by a worker in the same direction for nearly a decade.

May these lines help to direct the attention of those in authority towards the immunization process for glanders more than hitherto.

I am of the opinion that a rapid taking up of a vast wide reaching organization for the preparation of the vaccine and for the vaccination itself would very soon give results, which would be more advantageous to the fulfillment of our army's great tasks than the combating of the disease by the diagnostic methods, the apparatus of which has been rendered too cumbersome owing to the altered circumstances induced by the war. And also after demobilization, the complete or incomplete protection of the horses may exercise more of an opposing action against further ravages of a glanders epizootic in the civil population than the mere punctilious performance of diagnostic examination of the horses, which come to us from the land of an enemy.

I conclude: The execution of the Pfeiler proposals is to be warmly approved if it is carried out rapidly and *en gros* the great advantage thereof lies in that probably a materially bad effect is not to be feared.

REICHEL AND WERNER.

ADENO-CARCINOMA OF UNDESCENDED TESTICLE. J. C. Lewis D.V.Sc., B.Sc. *Australian Supplement Veterinary Journal*.—Five year old fox terrier had a hernia in the left inguinal region. Ex-

amination showed a firm, solid, almost immovable enlargement on the site of the internal abdominal ring. The swelling was not reducible. The denser part of the growth presented a movable attachment which was palpably not unlike a gut. In the scrotum, there was only one testicle present. The owner stated that a small swelling had been noticed a few months previously which had grown rapidly but gave rise to no general disturbance to the dog. Cutting down on the swelling, a greatly enlarged testicle was removed. The inguinal ring and skin were closed. The testicle was much enlarged and on section showed a firm new growth involving the whole tissue of the gland, which on microscopic examination proved to be an adeno-carcinoma.

LIAUTARD.

A STUDY OF TUBERCULIN. A. Jousset. *Revue de la Tuberculose*, Vol. II, pp. 305-327, July 1915.—There is but one tuberculin, whatever be its botanical origin. In bouillon cultures there is spontaneously formed a part of the specific substance to which tuberculin owes its precipitant and local action in the tuberculous organism. Tuberculin is stable only in concentrated solutions. Its dilute solutions rapidly become unfit for the cutaneous test. Heating intensifies certain properties of tuberculin, rather than weakens them. Therefore, heat has a double action in the preparation of tuberculin: liberation of active substances by decoction of the bacillary bodies; intensifying the action of substances already in solution.

The active principle of tuberculin, or "tuberculous specifine" is derived from the cleavage of bacillary protein; it is associated with the cleavage product of nucleo-albumins. If this principle is a substance possessing chemical individuality, it is neither a proteose nor a peptone, but may be related to the amino acids. It is a substance of such elusive nature that it is almost chimerical to attempt its isolation.

BERG.

SCAPULAR WOUND BY OBUS. Veterinary Major Darras and Briddee. *Bull. de la Soc. Cent.*—A chestnut mare, seven years old, had been wounded. Not entirely recovered she had on the right shoulder a fistula from which pus was escaping. She was in good condition and not lame. Probing of the fistula, which ran perpendicularly to the bone, revealed a rough bottom, but without the appearance of a foreign body. Free incision of the fistulous tract

and injection of antiseptic liquids formed the treatment. After a few days the condition of the mare had changed, she was very lame and the discharge of pus had become very abundant. For economical reasons the mare was destroyed. Post mortem: examination of the scapula showed on its superior third near the posterior border an ellipsoid perforation completely closed with fibrous tissue, except in its middle where there was a small opening from which pus was oozing. The posterior border of the bone was thickened and numerous bony deposits existed around the opening which, once removed from its fibrous tissue, had the aspect of a normal foramen. Under the scapula there was a piece of obus encysted in a mass of fibrous tissues.

LIAUTARD.

LACERATION OF THE VAGINA IN A COW. A. Oeller. *Münchener Tierärztliche Wochenschrift*, Vol. 67, p. 47, 1916.—A few hours after parturition, a cow showed a large tumor-like swelling on the left vulva, as large as a man's head. Otherwise the cow appeared to be entirely normal and ate eagerly. The swelling seemed to be firm and almost painless. Temperature normal. On attempting to introduce the right hand into the vagina, a strong resistance was encountered. The owner informed me that the cow had calved without assistance and had cleaned herself. A second examination of the swelling and introduction of the index and middle fingers disclosed an abnormal opening in the left wall of the vagina. By pressing on the swelling with the left hand from the outside, something was pressed out through the opening which I could grasp with the fingers. By gentle traction the after-birth came out, followed by a quantity of fetal fluid. Since the after-birth had already been passed according to the owner, the only possibility was that it had become torn and only part of it was passed. The laceration of the vagina may have been caused by pressure of the forelegs or head against the left vaginal wall during severe straining.

BERG.

VISUAL EXAMINATION OF THE BLADDER. J. C. Lewis, D.V.Sc., B.S. *Australian Supplement Veterinary Journal*.—The case is recorded to show the advantage that one may derive for the exact diagnosis of ailments of the bladder by the examination of the organ with the proctoscope. There is an illustration showing how the examination was made in the case of an aged draught horse suffering with incontinence of urine which was diagnosed as the result of

anatomy of the organ and was treated so as to give a comparatively satisfactory result. The case was specially presented to show that the examination of the bladder by this method will demonstrate clearly the nature of the internal aspect of the bladder and permit of a positive and sure diagnosis.

LIAUTARD.

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NYMPHOMANIA IN A 16 YEAR OLD MARE. George Wagner. *Münchener Tierärztliche Wochenschrift*, Vol. 66, p. 553, 1915.—In a 16 year old mare that had had 5 foals and which would not become pregnant, after several services, nervous symptoms appeared in the form of extreme irritability, striking and biting other horses or even people. This condition became aggravated during the course of 2 years to such an extent that the mare became a menace to life and had to be sold for slaughter. On the occasion of a severe attack, I was called by the owner, and found the animal in a state of highest excitement, dripping with sweat, continually pawing with the front feet and with these symptoms there were also grinding of the teeth and contraction of the abdominal muscles.

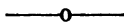
The administration of chloral hydrate and potassium bromide was without effect. Rectal examination disclosed hypertrophy of both ovaries. The owner objected to surgical treatment.

BERG.

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PETECHIAL FEVER AND ENDOCARDITIS COMPLICATED WITH ARTICULAR RHEUMATISM IN A HORSE. Mr. Nieder. *Rec. de Med. Vétér.*—A brown bay gelding, aged eight years, was brought to the writer suffering with high fever 39.6°C and 39.8°C and hyperleucocytosis (2000). The pulse varied between 48 and 59 a minute. Severe prostration, which suggested the idea of influenza, for which indeed the horse had been under treatment for a week. The diagnosis uncertain at first, was established four days after by the appearance of warm, diffused and painful swellings around the left fore fetlock. The myocardium was detected weak and the pulse went up to 90. The horse had myocarditis as a complication of the rheumatism. The endocarditis was not suspected as the beating of the heart remained clear and rhythmical although weak. Aspirin, in 100 gram doses, was given which lowered the temperature but did not affect the pulse. A few days later, the right knee was taken and also the posterior fetlock. The animal was in great pain and could scarcely stand up. Repeated doses of aspirin were followed

by an anorexia and complete adipsia. Salicylate of soda in 100 gram doses were given by the rectum with good results, the appetite improved but the pulse remained the same. The numerous petechial spots appeared on the nasal mucosa on both sides and on the lips. They disappeared with the injection of the serum of Jenner. The pulse was 100 and the heart beat was weak but clear. After a few days death took place with paralysis of the myocardium. The post-mortem revealed an ulcerative endocarditis, which had involved the entire tricuspid and a fibrous chronic endocarditis localized on the mitral. There was hypertrophy of the cardiac muscle and pulmonary edema.

LIAUTARD.



A COMPARISON OF VARIOUS STRAINS OF THE *BACILLUS PSEUDOTUBERCULOSIS RODENTUM* (PFEIFFER), WITH SPECIAL REFERENCE TO CERTAIN VARIATION PHENOMENA. Shigeshi Kakehi, M.D., (Japan). From the Bacteriological Dept., Lister Institute, London. *S. W. Jour. of Path. & Bact.*, Vol. XX, No. 3, January, 1916.—Since the *Bacillus pseudo-tuberculosis rodentium* was suggested by Pfeiffer (1889) as the active cause of the pseudo-tuberculosis of rodents, a disease which had already been described first by Malessez and Vignal (1883-1884), and then by Ebert (1885-1886), and Pfeiffer's theory of its cause was confirmed by Preisz (1894), the character of this organism has been exactly investigated in detail from all points of view by a great number of authors (cf. Poppe's monograph on "Pseudotuberkulose," 1913).

SUMMARY. 1. Several strains of the *B. pseudo-tuberculosis rodentium* (Pfeiffer) dealt with are quite aerobic, make broth more or less turbid for a certain time, and turn litmus milk alkaline within five days. Further, when they are inoculated in various carbohydrate liquid media, they show all the properties already well-known, and, in addition, a slow acid-forming action is invariably seen with adonite, this being readily accelerated by sub-cultivation.

2. When various liquid media inoculated with this organism are incubated for some time and then sown on agar plates, we obtain in every case three kinds of colonies. One of these kinds (A-colony type) possesses the characteristics of the usual type of colony of this organism, namely, an almost transparent, slightly bluish shimmer, while the other (B-colony type), which must be considered as a variant form, has a greyish-white, opaque appearance. The third form (C-colony type), which must be considered as a transition stage between A- and B-colony, consists of a greyish-white, opaque centre and an almost transparent marginal zone.

3. A-colonies, the genotypical form, when repeatedly sown on agar plates, always produce only the same kind of colonies. B-colonies, on the contrary, upon further sowing return to the genotypical form in certain generations by means of forming the third form, C-colonies. The peripheral part of these always produces A-colonies, while the central part gives birth to the variant form, B-colonies.

4. The bacilli in B-colonies are definitely distinguishable from those in the genotypical form by some slight morphological differences and by the fact that they keep broth quite clear from the beginning and acquire a high viscosity in association with high agglutinability, as well as by showing more slowly their characteristic action on adonite.

5. Some strains of this organism, when repeatedly cultivated on agar in the ordinary way, acquire to some extent at a certain stage, properties resembling those of B-colony bacilli. They show a high viscosity combined with high agglutinability, almost lose the property of making broth turbid, and their action is sluggish in fermenting adonite, while in other points there is no distinctive difference. Those strains which have been cultivated in various liquid media are much more liable to produce variant forms.

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REICHEL.

FORMOL IN SEVERE CASES OF DISTEMPER. Veterinary Major Chouleur. *Bull. de la Soc. Cent.*—Wishing to experiment with the method of Bottini in the treatment of gangrenous pneumonia, the author has resorted to it with several young horses affected with severe distemper and having intra-thoracic localizations. Bottini's treatment consists in the intratracheal injection of 10 c.c. of a solution of formol at 4%. The technic is simple. The anterior face of the trachea, at its superior third, is shaved and disinfected. With a fine trocar sterilized and a Pravaz syringe 10 c.c. of a solution of 4 grams of formol in 100 grams of distilled water is slowly injected. No secondary accidents follow, except that in some animals short spells of coughing occur. It is essential to resort to this injection as early as possible on animals which show alarming symptoms and before material lesions have taken place. When applied at the proper time, the formol acts by its antithermic properties and the temperature which had remained above 40°C for some time will, after the second or third injections, drop to normal. The antiseptic properties of the drug will also have a powerful influence.

LIAUTARD.

PROCEEDINGS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

(Continued from page 431)

DR. R. C. MOORE: It seems to me we will have to modify our minutes a good deal on this morning's work. If I remember correctly, Dr. Dunphy's motion was that the members of this committee be elected by the association. Finally that motion was amended and accepted by Dr. Dunphy that a committee of three be appointed to select a group of men from which to select or elect these members.

DR. KINSLEY: There is another motion on record providing that there were to be five on this committee, one to retire each year, and a new man appointed for five years each year.

DR. DUNPHY: Was that resolution put and recorded in the record?

DR. KINSLEY: Yes, put and carried.

DR. KNOWLES: If an amendment could be entertained to this motion now. I would like to move to amend the motion to the effect that the minutes of this morning with reference to the appointment and election of the committee shall read, instead of five years, seven years, with one member retiring each year. I will offer that as an amendment to the motion.

DR. MAYO: This can be better accomplished by simply accepting the report of the committee and having the resolution read that they accept the committee's suggestion of seven members instead of five. That is all that is necessary. Then go on and provide that a new member shall be elected each year. They will automatically replace themselves. I also think this resolution should carry with it an amendment that the number suggested by this committee be appointed by this association that appoints the committee at the same time.

PRESIDENT MARSHALL: Are you ready for the question? All those in favor of accepting the recommendation of the special committee make it manifest by saying "aye"; those opposed "no". The ayes have it. It is ordered.

DR. S. STEWART: I move that these gentlemen be elected to this memorial committee. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: You have heard the motion, that the seven gentlemen named be elected as members of this committee. All those in favor of their election make it manifest by saying "aye." Opposed "no.". The ayes have it. It is so ordered. I would like to ask a question in reference to Dr. Winchester,—I wrote him asking him to act as chairman of the committee. I think Dr. Hoskins wrote him. He said he could not act on any committee. It may be he refused because he did not intend to attend, or it may be that he is not physically able to act on the committee.

DR. KNOWLES: Whenever there is a vacancy the chairman can fill it.

DR. HOSKINS: I think Dr. Winchester's feeling was that he could not accept the chairmanship or secretaryship. He has done an enormous amount of work on this committee.

DR. V. A. MOORE: I am sure you are all very anxious that the committee shall be an efficient one, and we all know the good Dr. Salmon did for the veterinary profession. He made constant and persistent effort to uplift it in every way possible. The suggestion I have to make is this: that the committee reported by Dr. Hughes be composed of seven instead of five members, because we feel that seven would be more efficient than five. For one reason, we wished to get these people distributed over the country a little better. The point is, we feel very keenly the difficulty this committee is going to have in circularizing and getting at the individuals who may be willing and glad to contribute money. The New York State Veterinary Society at its meeting the first of August appointed a committee for the purpose of collecting funds for this memorial from the New York people, and the committee was instructed to co-operate with the committee appointed by this association. I think if, when we return to our homes, each member would seek to interest his own state society and get it to appoint a committee to collect funds from members in that state, men belonging to the society first perhaps, and then those not belonging, and then if the committee, just suggested, should communicate with the chairmen of these state society committees, we would have the entire country covered. Every practicing veterinarian in the country would have a chance, or an invitation (for I would consider it a privilege) to contribute to this fund. It would hasten matters very materially, and I believe would help us to get a much larger sum than by the solitary efforts of this central committee.

DR. KNOWLES: Dr. Moore's proposition reminds me of one thing. I am secretary of our association in Montana. I think one way in which this memorial may be brought to the attention of the veterinarians is by placing a circular letter, with all the members of the profession in the state, explaining clearly the object and the system and the method by which this is to be carried into effect. Whether each state shall formulate such letters, which must of necessity be of considerable length, or whether this memorial committee shall furnish such circular letter is a matter of detail to be decided later. If this matter could be taken up by each of our associations and talked over with the members, it will stimulate interest. When it comes to reaching those who are not in the associations, it would take a written request, for a contribution to the Salmon Memorial Fund, containing sufficient information to show what we are trying to do. This would appeal to a good many persons, and I believe it would bring more money from people who would not otherwise contribute.

DR. R. C. MOORE: How do we know, how does the committee know, which members are elected for one year, and which for seven years?

DR. KINSLEY: Let them settle that.

DR. HUGHES: I do not know whether the committee's work ceased with the presentation of that report or not. I might mention that the committee arranged the names in the order in which the committee thought it should be done.

PRESIDENT MARSHALL: Are you willing to leave it to the committee to settle it for themselves?

DR. JENSEN: Leave it to the committee.

PRESIDENT MARSHALL: Is there anything else to be said on this subject? Dr. Campbell just told me that he learned of one other deceased member since he read his report. That is Dr. R. R. Hammond, of Chetopa, Iowa. The next order of business is the report of the committee on resolutions by Dr. Shepard. Whereupon Dr. Shepard read the report of the committee as follows:

Whereas, through the foresight and generosity of John D. Rockefeller, by means of the Rockefeller Foundation, an Institute for research in diseases of animals has been established, and its maintenance provided for in our country, which is certain to be of immense value in the conservation of the livestock interests not only of the United States but of the entire world:

Therefore, BE IT RESOLVED, that the A. V. M. A. recognizes its value and appreciates the generosity of Mr. Rockefeller.

DR. KINSLEY: I move the adoption of the resolution. Seconded by Dr. R. C. Moore.

PRESIDENT MARSHALL: It has been moved and seconded that the resolution be adopted. All those in favor signify by saying "aye"; those opposed "no." It is carried.

DR. SHEPARD: Whereas, the livestock interests of this country have recently been menaced by that fatal animal plague, foot-and-mouth disease; and

Whereas, the methods adopted by the Bureau of Animal Industry, United States Department of Agriculture in the control and eradication of this disease, have succeeded in practically wiping out the infection:

Therefore, BE IT RESOLVED: That this association express its hearty commendation of the methods employed by the Bureau of Animal Industry in its monumental task of circumscribing the area of infection as much as possible and thereby aiding in the protection of other sections of the country which otherwise must have shared in the general infection; and

BE IT FURTHER RESOLVED: That in the opinion of this association the gratifying results obtained could not have been secured in the time by other means than those employed, nor under other authority than the Federal Bureau of Animal Industry as at present constituted.

DR. KINSLEY: I move the adoption of the resolution. Seconded by Dr. R. C. Moore.

DR. TORRANCE: Mr. President, I would like to call attention to the use of the word "fatal" in describing the disease. I think you are all aware that

the disease is not fatal. I would like to have the word changed, substituting therefor, the word "serious".

PRESIDENT MARSHALL: Dropping the word "fatal" and using instead the word "serious", are you ready to recommend the adoption of the resolution? Those in favor of the motion make it manifest by saying "aye". Opposed "no". The ayes have it. It is so ordered.

DR. SHEPARD: Whereas, the 51st annual meeting of the A. V. M. A., held in Oakland, Calif, has proved an unqualified success, due to the admirable location and other local features, but especially to the splendid efforts of the various local committees, and the hospitality of the good people generally:

THEREFORE, BE IT RESOLVED: That the sincere thanks of this association be extended to all who in any way contributed to the success of the meeting: and

BE IT FURTHER RESOLVED: That special thanks are due the press of Oakland for the large amount of space devoted each day to the deliberations of the association; and

BE IT FURTHER RESOLVED: That an expression of appreciation and thanks is hereby tendered the management of the Hotel Oakland for its efforts toward the success of the meeting.

Signed by Drs. Dalrymple, Nelson, Norton, Rutherford and Shepard, chairman pro tem.

DR. KINSLEY: I move the adoption of the resolution. Seconded by Dr. Hoskins.

PRESIDENT MARSHALL: All those in favor of adopting the resolution signify by saying "aye"; opposed "no". The ayes have it. It is so ordered.

DR. HOSKINS: I move that the report as a whole be accepted. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: It has been moved and seconded that the report as a whole be adopted. All those in favor of the adoption of the report signify by saying "aye"; opposed "no". The ayes have it. It is so ordered.

Has anyone else a resolution to be adopted?

DR. STEELE: Mr. President, I did not hear the names of the speakers at the banquet last night. I think they were Mr. Hunt and Mr. Lively. I think these men should be recognized by a communication from the A. V. M. A. with thanks. I make a motion to that effect. Seconded by Dr. Hoskins.

PRESIDENT MARSHALL: It has been moved and seconded that a letter of thanks be sent to Messrs. Hunt and Lively for the interesting addresses they gave us last evening. Any remarks? If not, those in favor manifest it by saying "aye"; those opposed "no". The ayes have it. It is so ordered.

There are two or three other matters on the program to be called for. The glanders committee, for instance, that committee has made no report. There is

no report from Dr. Milks, the delegate appointed to the American Pharmaceutical Association. That completes the program with the exception of the special business for which the meeting was called.

DR. NEWSOM: Owing to the fact that the report of the committee on veterinary anatomical nomenclature was not published and it was not deemed advisable to recommend its adoption at this meeting, I want to give notice that after it has been published, I presume a year hence, that motion will be forthcoming, so that you may be thinking about it.

DR. MAYO: I do not understand the Doctor's statement. The report of the committee has been presented and accepted by the association. I have the report in my possession now.

DR. KINSLEY: When was it accepted?

DR. MAYO: I say, it was presented to the association.

PRESIDENT MARSHALL: I think it was accepted. That is the term which was used.

DR. NEWSOM: I did not understand that that carried with it the adoption of all those names by this association. I am not complaining if that is the construction put upon it.

DR. MAYO: I understand that the association has accepted this report and has accepted those names because it is practically all names and nothing else. If they accept it they accept the names.

DR. MURPHEY: I was unable to be present when this report was submitted, but I have attended previous meetings where a report of this kind has been submitted, and I believe there is a feeling among some of the teachers of anatomy that it is not fair to adopt this until we have had some chance to examine it in detail. There may be some difference of opinion, not only in regard to terms but to construction which should be settled one way or another before we finally adopt them. I believe there was a committee appointed at the New York meeting to prepare this report and the committee prepared a report and asked for the publication of it so that it might be submitted to the schools and thus get some concerted action before this meeting. I am informed that the secretary of the association refused to honor the bill for the publication and refused to allow the report to be submitted to the various colleges, as was the intention. I do not believe it is fair to consider it until we have had a chance to examine it.

DR. S. STEWART: An acceptance of a report is not the adoption of the report. This is a very important matter, and there has been a considerable number of people interested. If this association adopts the nomenclature submitted by this committee, then it becomes an official statement issued by this body. I am in hopes this body will do so. It ought to do so, fully understanding what the adoption of the report signifies. I am glad Dr. Newsom has given notice that one year hence he will move the adoption of that report.

DR. MAYO: The report of the committee as has been fully explained to the association, was presented at the New York meeting, or at least a portion of the report was presented. All that had been completed up to that time was accepted and published in the official proceedings of this association and is a

part of the official minutes. We have already adopted that system of nomenclature,—all we could. The additional report of that committee was furnished to me, and as there were no funds in the treasury to pay for republishing what had already been published—over sixty pages of typewritten anatomical names, I did not think it wise to draw a voucher on an empty treasury, I therefore referred the matter to the executive committee for their action, and in so far as I was responsible for presenting this matter to the executive committee, I assumed that responsibility. The executive committee, however, voted under the conditions, not to publish that and send it to all members of the association, which would have been an expense of about two hundred dollars or more.

DR. MURPHY: Do we consider that this has been adopted officially, or do we not?

PRESIDENT MARSHALL: My opinion is that accepting the report does not mean endorsing it. If we wish to make that the official standard of this association we must do something more.

DR. CAMPBELL: That brings us back to the question that came up before. About the glanders report—I notice in the treasurer's report, circulated here, there are a number of expense accounts for that committee. Is that for the present report that has not been submitted, or was that in payment of the expense in connection with the report of the last year?

DR. MAYO: I think that was for the expenses incurred previous to the New York meeting. I think these bills were held over and paid, as I recollect it now, since the last report. I have drawn no vouchers for this present committee. I could tell by looking at my books.

DR. CAMPBELL: I merely wanted to move that the committee be given a further chance to get up their report and hand it in, as we had already spent some money on it, but since we have had our money's worth, I will not make any motion.

PRESIDENT MARSHALL: If there is no further business we will hear the report of the executive committee up to date.

DR. MAYO: Unfortunately the stenographer who took the report this morning has not his notes written up and I have not been able to find him. I can tell you, however, that the executive committee recommends that the list of accepted colleges published in the 1913 report be accepted as the list of accredited colleges for the coming year. Ontario has already been accepted by special vote this morning.

DR. HOSKINS: I move its adoption. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: It has been moved and seconded that we accept the report of the executive committee with reference to the accredited list of colleges. Any remarks? If not; all those in favor of the motion signify by saying "aye"; those opposed "no". The ayes have it. It is so ordered.

DR. MAYO: The recommendation of the committee on colleges that the general plan of submitting the committee report in two sections, one for reading and publication; the other a supplemental report consisting of criticisms and suggestions prepared by the committee for transmissal by the association secretary to the college concerned, be approved and continued.

DR. KINSLEY: I move that the recommendation of the committee be adopted. Seconded by Dr. Hoskins.

PRESIDENT MARSHALL: It has been moved and seconded that the recommendation of the committee be accepted. All those in favor of the motion signify it by saying "aye"; those opposed "no". The ayes have it. It is so ordered.

DR. MAYO: The recommendation of the committee on colleges which would provide for a re-organization of the committees on intelligence and education and on college investigation. I will read that part of the recommendation: "We would again call attention to the overlapping of the committee on college investigation and the committee on intelligence and education, and we again recommend the adoption of some plan similar to that of the American Medical Association, a fairly stable council involving the inclusion of these two committees. We propose the following by-law amendment: Substitute for the 5th line of article 7 the following: Committee on Veterinary Education of 3 members, term of office 3 years, and one membership expiring each year. Substitute for section 2 the following: It shall be the duty of the committee on veterinary education to investigate the work of the American Veterinary Colleges, and to report to the association such general findings, suggestions and criticisms concerning the same as it may deem advisable. It shall also be the duty of this committee to annually recommend to the association a list of veterinary colleges for recognition by the association with reference to eligibility to membership of their graduates. It shall also be the duty of this committee to keep in touch with the general progress of education in the veterinary and allied professions, and make such report from time to time as it may deem advisable."

It is understood that it would be recommended to the incoming president to consider this question.

DR. HUGHES: There are several members of the committee on intelligence and education present. Is it the idea to pay their expenses incurred in making these examinations?

DR. MAYO: I would say in answer to that, that generally not over two members of the committee visit a college, and sometimes only one of the regularly appointed committee, and a member of the association is appointed from that immediate neighborhood to make the examination. If it is a matter of some distance where the travelling expenses are great, only one member of the committee has gone, and a temporary member of the committee has been appointed to assist in making the inspection. This temporary member being a resident of the immediate locality, it means the saving of considerable expense. It is the plan of the executive committee that this custom shall be followed with reference to the committee on intelligence and education.

This arrangement would give five members scattered over a wider territory, so that one member of the committee at least will have an opportunity to visit a college.

DR. S. STEWART: Do I understand that the purpose of this recommendation is to do away with one of the committees, and that by voting in the affirmative we can dispense with one committee and add the duties of the other committee

to it at the same time? In other words, whether a motion to that effect can accomplish that end? Personally, I should be glad to see the two committees merged but I am not sure but three members on that committee would do more work than five. Oftentimes one man with power to call in help, can accomplish the same thing. I think three are sufficient.

DR. MAYO: The veterinary college investigating committee is a committee of three. It was the plan of the executive committee to assign their duties to the committee on intelligence and education. It was understood that they would have a sub-committee of three, or use their best judgment in regard to that.

DR. DUNPHY: When this committee was organized or authorized by the association, there was a certain sum, \$500 I believe, set aside to defray the expenses. There was no regular rule laid down by any by-law, under which this committee should operate. We met in Chicago and elected Dr. Tait Butler president at that time, and we formulated a certain regulation that we should follow in this work. We found that the funds were not sufficient, unless we divided up the work, and even then we could scarcely reach all the colleges. We divided the work: one member was to investigate a certain college, and the other members of the committee agreed to have some local man in the locality who was not connected in any way with the college to make the second member of that committee to investigate the college. We carried out these regulations. That is, in talking it over with Dr. Reynolds, the chairman of the committee, we decided that the association should have some regulations in the by-laws whereby the duties of this committee should be regulated and we believe, owing to the overlapping duties of the two committees, it would be better to combine them in some way, if the committee saw fit.

DR. HOSKINS: I move the adoption of the recommendation. Seconded by Dr. Jensen.

DR. MARSHALL: Does this mean we are recommending an amendment to the by-laws?

DR. HOSKINS: No, the special committee is not provided for by the by-laws. The special committee retires, as I understand it, and the regular committee fixed by your by-laws takes on the duties of the special committee.

DR. S. STEWART: I would like to know whether or not this committee would have any special funds to do anything with, or whether they will be on the same basis as they are at present?

PRESIDENT MARSHALL: I presume that would have to be taken care of if we dispose of this question. Are there any remarks with reference to the adoption of the recommendation?

DR. MAYO: I will say that in regard to Dr. Murphey's suggestion on the report of the committee regarding provisions in the by-laws, that as the constitution and by-laws were being revised it was thought by the committee that that recommendation would be taken care of in the revision.

PRESIDENT MARSHALL: All those in favor of accepting and adopting the recommendation, make it manifest by saying "aye"; those opposed "no". It is carried. It is so ordered.

That finishes the report of the executive committee.

There have been no appropriations made for the various committees. Shall we take that up now, or wait until this evening? It is called for now, so if there is no objection, we will proceed with the matter of appropriations. Do any of you know what will be wanted for these committees?

DR. S. STEWART: I move that the committee on intelligence and education be appropriated \$500 or such portion thereof as may be needed to carry out the work of the committee.

PRESIDENT MARSHALL: Was there a recommendation made by the executive committee that all recommendations for appropriations be referred to the finance committee?

DR. MAYO: No. That recommendation was made in the secretary's report, because sometimes toward the close of the session, in the hurry of closing, resolutions are put through appropriating money without due consideration, and in the low state of the treasury it might be rather embarrassing for your secretary to have to hold up appropriations which were made by this association. It was not because I was not in favor of publishing the reports of the Committees. It was simply because we did not have any funds to publish them with. For that reason, I recommended that all resolutions appropriating funds should be referred to the finance committee. I did not think it would make any difference if they were referred to the executive committee, but the finance committee hasn't much to do, and I did not want them idle.

PRESIDENT MARSHALL: It seems rather important that we have some check on the appropriations. Each of you connected with a committee is (and very naturally too) exceedingly anxious to have money enough to do the work and do it well, and with your anxiety you frequently go beyond the amount we can give you.

DR. HOSKINS: I trust when these resolutions are passed or appropriations made, it shall be considered whether that money is actually set aside. I ran up against a situation where there was \$1000 appropriated in 1912 for the entertainment of any delegates from the countries of continental Europe. That \$1000 was not utilized at all because there was no one who came over from Europe. That \$1000 had been set aside in 1912 to be used in 1913. I went before the association and asked that that \$1000 which had been wisely appropriated and set aside, should be turned over to the legislative committee to continue its effort in behalf of the Army Veterinary Service Bill and to look after such other legislation passing through Congress as might affect the interests of the profession, and it was done. But I was not able to get that money until recently—some time in May I got the balance of the money. It wasn't much of a hardship but it happened frequently that the committee was in my personal debt two or three hundred dollars.

DR. MAYO: No one is more anxious than I that every bill shall be promptly paid and in the case of every bill that has been presented to me with one single exception, a voucher has been drawn and forwarded through the proper channels immediately to the treasurer. Those of you who know Dr. White know that at the previous meetings he has sat on the lid of the treasury and has repeatedly called the attention of this association to the fact that they were

appropriating monies when they did not have any to appropriate. As a matter of fact, when the proceedings of the last meeting were published, the association was \$3000 in debt. They could not set aside \$1000 unless they borrowed it. We borrowed the money to pay the indebtedness. Whether the treasurer has set aside sums for these appropriations, I do not know, but I don't think he has, because he did not have it to set aside. It is my impression that he has paid the most pressing bills of the association, but those who are long-suffering and good natured, like Dr. Hoskins and some others, have been put off.

DR. HOSKINS: I am not complaining, but it seems to me we ought to be able to calculate what our expenses are, and there should be some restraint put on committees. When money is once appropriated, it should be set aside to cover the appropriations for those committees so that they will not be hampered. In the case of the legislative committee we were not hindered or disturbed in any way. We went right on with the work. It had to be done at that time, and we did it.

PRESIDENT MARSHALL: The motion has been made by Dr. Stewart. Was it seconded?

DR. KINSLEY: If it wasn't seconded, I will. I second the motion.

PRESIDENT MARSHALL: The motion has been made by Dr. Stewart and seconded that the association appropriate for the use of the committee on intelligence and education a sum not to exceed \$500. Any remarks?

DR. CAMPBELL: I want to move an amendment of that motion. I have heard other members of the committee state that they would like to bring the appropriation for this committee up to such a sum as would enable them to visit all the schools in one year. I know it has been the custom to visit one school one year and another school another year, and others at another time. I have heard criticisms of the committee because they could not visit all the schools in one year. It is a hard matter to make comparisons of the different schools when the visits are so far apart, and conditions may be different one year than another. I am sure the work of the committee could be done more efficiently if the appropriation were sufficient to make it possible to visit each school in a year. Now, if you limit the appropriation to \$500 they will not be able to visit the schools all in one year. It will take them nearer three years to make the rounds. I would like to amend that motion to read "an amount sufficient to permit at least two members of the committee to visit all of the schools published in our accredited list and any others which might make application for listing on the accredited list in one year."

PRESIDENT MARSHALL: Have you any idea how much that would amount to?

DR. MCCAIN: That brings up the very point we have been discussing, in the matter of appropriations. I am afraid if the appropriations are going that way from the house to the finance committee, it will lead to a great deal of trouble. It has occurred to me to offer the suggestion that the chairmen of the various committees which require appropriations for their work should communicate their desires at once to the finance committee, and let that committee report back to this association with recommendations which can be adopted or rejected as you see fit.

DR. KINSLEY: As the finance committee is listed here simply for the purpose of examining the books, and their duties are explained and limited by the constitution and by-laws, I think that will complicate matters more. It seems to me, under the circumstances, if any reference is to be made, it should be made to the secretary and then submitted to the executive committee. At the present time we have to look after, first of all, the journal. I don't know whether these gentlemen have determined the amount of money demanded for that. At any rate, they will have a better idea of the financial standing of this organization than anyone else. I do not see how it will facilitate matters by referring it to the finance committee.

DR. R. C. MOORE: As this organization is largely for the benefit and the up building of veterinary knowledge and veterinary science, I believe that our educational interests are one of the first things to be considered, and to do that, we must naturally and inevitably spend some money. I believe great good has come from the work of this committee, and I believe it should be fostered. Therefore, I will offer as an amendment to Dr. Stewart's motion that this be made \$1000 instead of \$500.

DR. DUNPHY: I see a great deal of force in what Dr. Campbell has said in regard to the work of the committee investigating colleges. The first year the committee had to divide its work up and at the same time they had to postpone their visits to some colleges for another year. It was fortunate that we had two members with the Bureau of Animal Industry who were going to California on official business, and they made some of the investigations, thus saving us some expense. Then those two members that were appointed by the Bureau of Animal Industry went to Terre Haute, Indianapolis, Cincinnati, and Columbus, and I went with them. That saved the expense of another member of our committee going. When we reached Washington Dr. Eichhorn kindly assisted me with the colleges there. If it had not been for that, we would not have been able to do as much as we did. But for those fortunate circumstances we could have done little in the inspection of colleges on the amount assigned us. Further I would say that being a member of the committee for three consecutive years, I could see that there was a wonderful change on the part of the colleges owing to the fact that they had been investigated by the committee and expected to be investigated from year to year. They had taken advantage of friendly criticism offered by the committee and had improved their institutions in a large measure. I think Dr. Campbell will bear me out in that statement. He was associated with Dr. Reynolds this year in inspecting some of the colleges and Dr. Reynolds no doubt has told him how we found these colleges when we first started in on the work.

DR. MAYO: In appropriating \$1000 a year for this work, I want to call attention to a fact which should be borne in mind, and that is the resolution providing for an amendment to the by-laws raising the dues to \$5 a year does not go into effect until a year from now, and you are now running on the \$3 a year dues basis. You have something over \$3000 in the treasury at the present time—(probably not that much when the outstanding bills are paid; I am sure it is not over \$2500,) to run this association for the coming year. Don't forget that. Do not think I am trying to cut these committees down—

I would not for a minute—I would give them \$2000 if we had it to give. It is easy to appropriate money, but those of us who have to pay it out when we haven't it, know how embarrassing it is. It brings this association into disrepute to have to hold its bills for printing and things of that sort until we can get enough money in the treasury to pay them. It is not right.

DR. S. STEWART: I would like to modify the amendment of Dr. Moore and my motion. Instead of "the appropriation shall be \$1000 or as much thereof as shall be needed", change the wording thereof to "as much thereof as may be available" and leave it that way so that the secretary and the president and this committee may decide."

DR. KINSLEY: I accept that modification.

DR. MAYO: I will not assume that responsibility.

DR. HOSKINS: I think this is very unfair to the incoming president or the incoming secretary to put that burden on them. I know how it will be. The committee will do the work; the bills will go to the secretary who will draw vouchers as promptly as they are called for; the vouchers will go to the treasurer; and if the money isn't at the other end of the line, the voucher will just stay there. I think it is very unfair. Then again think of the discord it will create among the committees. If I get the money and the other committee does not, there would be criticism of the officers and I would be accused of having a pull.

DR. MAYO: I just want to call your attention to the position such a measure would put us in. For instance; this association votes \$1000 to any one committee and the chairman of that committee immediately puts in a bill for that \$1000. We will say three committees have \$3000 appropriated, and put in a bill for the full amount of the appropriation and I draw a voucher, and it is taken out of the treasury. Then what are you going to do?

DR. S. STEWART: But if the appropriations are made by the officers who are in touch with the situation, pro rata, are they not the best persons to make appropriations, because they have the knowledge to do it with?

DR. NEWSOM: Mr. President: I believe that in the appointment of this committee the president could take into consideration the location of the various colleges and so arrange the location of the five members on this committee that the investigation could be easily done on \$500. Speaking from the standpoint of our school I will say we would like to have all five members of the committee visit us. But as that seems to be impossible under the circumstances, we will be satisfied with one, and I believe \$500 would be sufficient for this year.

DR. CAMPBELL: I want to make myself clear to some who may think I am trying to see money going out of the treasury. I think this association has never done any work that is more important than the work done by that committee on college investigation, and I think there is no other work that needs to be done more thoroughly from what I know of the work. I would like to see the association appropriate enough to do it thoroughly, but if funds are not available, then let the committee take longer to do it. I would rather see it done thoroughly once in two years, than to have it done half way in one year. Do it thoroughly or not at all.

DR. ELLIS: From the reports we have received from year to year and especially this year from the committee on college investigation, I think they

have accomplished a great deal on that \$500 and I think it would be very unwise to cease operations. I would say, do what you can with the \$500. They have done wonders. Continue on that line until you can appropriate the \$1000 or \$2500 if you have it.

PRESIDENT MARSHALL: The question is called for. May I speak a minute and not put the question? Our funds are limited, and we have not heard from the other committees. I think we ought to find out what is wanted by all. What is the use of making appropriations if we haven't the money to meet them with? I am seriously in doubt whether we can afford to allow this committee \$500. It seems to me it would be better if the association had an appropriation committee which would examine into all these matters, hear the different committees as to their wants, and then recommend to the association what, in their best judgment, can be given, and let the association consider the recommendations. I am ready to submit the question if there are no further remarks.

DR. KINSLEY: How would it be to have the president, secretary and treasurer compose an appropriation committee? The two men at least, and the third being the president, all would be in close touch with the organization and would know what could be appropriated. It seems to me this would be the best way.

DR. MURPHEY: I move a substitute motion; that the finance committee be appointed and the Babson system adopted.

PRESIDENT MARSHALL: There is a motion before the house and unless the movers and seconders are willing to withdraw their motions, I cannot entertain your motion.

DR. KINSLEY: Isn't that a change in the by-laws anyhow? It would lay over a year.

PRESIDENT MARSHALL: What will we do with the original motion?

DR. S. STEWART: The original motion seems to stand before the house with Dr. Moore's modification.

PRESIDENT MARSHALL: That was not seconded.

DR. S. STEWART: Undoubtedly it would be absurd for this association to make appropriations for this committee next year if our secretary feels sure the bills already incurred and unpaid would not allow any appropriation. Better not spend money before we get it, and I have felt that we might correct such a possible condition of spending money before we got it by leaving it with the secretary, treasurer and president, and let them be a committee to determine whether those funds are really available or not. We want to know, when the meeting is over and the bills are all paid, how we stand. There may not be a dollar left for our committees, after the indebtedness of establishing a journal along the lines contemplated are met. There may not be a dollar available. The committee ought to know whether there is any money before they ask for appropriations. Is it available? The secretary and treasurer can advise us if there are any funds. That was my idea in making the motion, and I made that as a modification, subject to the direction of the president and secretary as to the availability of the money.

DR. KINSLEY: If I seconded the original motion, I will accept that modification.

DR. MAYO: I think the treasurer ought to be on that committee.

PRESIDENT MARSHALL: The president, secretary and treasurer, is that the way you understand it?

DR. MAYO: Just a word before that motion is put. You know that every committee thinks its own work is the most important work of the association, and properly so. I think that a committee, to be efficient, must have that spirit. Now when the present secretary or rather the executive committee took this matter in hand this year, I know that the committee felt hurt and they had cause. The committee's report was one of the best committee reports that has been presented to this association, but the executive committee with the secretary did not feel that the publication of that report and the expenditure of the money was as important as some other things. It is for you to decide.

DR. R. C. MOORE: I would like to call attention to the fact that the committee is appointed to investigate these colleges and is asking for the necessary funds. Does not the association ask the college committee to do this work? Should not the committee be supplied with funds so that they can work?

PRESIDENT MARSHALL: Are you ready for the question?

DR. FROTHINGHAM: What is the question?

PRESIDENT MARSHALL: I will ask Dr. Stewart to state the question again.

DR. S. STEWART: It is moved that we appropriate the sum of \$500 or less as may be needed, by the committee on investigation of colleges, subject to the findings of the appropriation committee, composed of the president, secretary and treasurer, as to whether that sum is available.

PRESIDENT MARSHALL: You have heard the motion as stated by Dr. Stewart. All those in favor signify by saying "aye"; those opposed "no". It is carried. The motion is unanimously adopted.

DR. HOSKINS: I would like to ask for an appropriation of \$500 for the legislative committee. I hope ultimately an important work will be done. I feel confident Congress will pass this bill and I offer that as a motion because a great deal of this money has already been expended. There will be a new Congress and the work will go on just the same. In December, of course, Congress will meet and the expense then will accrue very much faster. I want to say that the army veterinarians are co-operating with our committee in the matter of work and money and the utmost of their time.

PRESIDENT MARSHALL: Will you accept this appropriation under the conditions which Dr. Stewart has stated?

DR. HOSKINS: Yes.

DR. KINSLEY: I second the motion.

PRESIDENT MARSHALL: The motion has been made and seconded that \$500 be appropriated to the legislative committee under the same conditions stated by Dr. Stewart in moving the appropriation for the college investigation committee. Any remarks? Those in favor of the question make it manifest by saying "aye"; those opposed "no". The "ayes" have it. It is so ordered.

The time for adjournment has arrived. The session to-night for the election of officers is scheduled for 7:30. The election of officers is the only thing left. We will begin promptly at 7:30. If there are no objections we will stand adjourned until that time. That means 7:30. Be prompt, gentlemen.

(To be continued)

MEETINGS OF THE ASSOCIATION

1863. First Meeting, New York, N. Y., June 9 and 10.
1864. Semiannual (comitia minora)—New York, N. Y., Jan. 19.
Annual—New York, N. Y., September 6.
1865. Semiannual—New York, N. Y., March 7.
Annual—Boston, Mass., September 5.
1866. Semiannual—New York, N. Y., March 5 and 6.
Annual—New York, N. Y., September 4.
1867. Semiannual—Boston, Mass., March 5.
Annual—New York, N. Y., September 3.
1868. Semiannual—New York, N. Y., March 5.
Annual—Boston, Mass., September 1.
1869. Semiannual—Boston, Mass., March 16.
Annual—New York, N. Y., September 21.
1870. Semiannual—Philadelphia, Pa., March 15 (no quorum).
Annual—New York, N. Y., September 20.
1871. Semiannual—Boston, Mass., March 21.
Annual—New York, N. Y., September 19.
1872. Semiannual—Boston, Mass., March 16.
Annual—New York, N. Y., September 17.
1873. Semiannual—Boston, Mass., March 17.
Annual—New York, N. Y., September 16.
1874. Semiannual—Boston, Mass., March 17.
Annual—Not held, owing to error in date of notices sent out.
1875. Semiannual—Boston, Mass., March 25.
Annual—New York, N. Y., September 21.
1876. Semiannual—Boston, Mass., March 21.
Annual—New York, N. Y., September 10.
1877. Semiannual—Boston, Mass., March 20.
Annual—New York, N. Y., September 18.
1878. Semiannual—Boston, Mass., March 19.
Annual—New York, N. Y., September 17.
1879. Semiannual—Boston, Mass., March 18.
Annual—New York, N. Y., September 16.
1880. Semiannual—Boston, Mass., March 16.
Annual—New York, N. Y., September 1.
1881. Semiannual—Boston, Mass., March 13.
Annual—New York, N. Y., September 20.
1882. Semiannual—Boston, Mass., March 21.
Annual—New York, N. Y., September 19.
1883. Semiannual—Boston, Mass., March 20.
Annual—New York, N. Y., September 18.
1884. Semiannual—Boston, Mass., March 18.
Annual—Cincinnati, Ohio, September 16.
1885. Semiannual—Boston, Mass., March 17.
Annual—New York, N. Y., December 15.

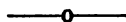
1886. Semiannual—Boston, Mass. No legal meeting held (no quorum).
Annual—New York, N. Y., September 21.
1887. Semiannual—Philadelphia, Pa., March 15.
Annual—New York, N. Y., September 20.
1888. Semiannual—Baltimore, Md., March 20.
Annual—New York, N. Y., September 18.
1889. Semiannual—Boston, Mass., March 19.
Annual—Brooklyn, N. Y., September 17.
1890. Chicago, Ill., September 16 and 17.
1891. Washington, D. C., September 15 and 16.
1892. Boston, Mass., September 20, 21 and 22.
1893. Chicago, Ill., October 17, 18, 19 and 20.
1894. Philadelphia, Pa., September 18, 19 and 20.
1895. Des Moines, Iowa, September 10, 11 and 12.
1896. Buffalo, N. Y., September 1, 2 and 3.
1897. Nashville, Tenn., September 7, 8 and 9.
1898. Omaha, Neb., September 6, 7 and 8.
1899. New York, N. Y., September 5, 6 and 7.
1900. Detroit, Mich., September 4, 5 and 6.
1901. Atlantic City, N. J., September 3, 4 and 5.
1902. Minneapolis, Minn., September 2, 3 and 4.
1903. Ottawa, Canada, September 1, 2, 3 and 4.
1904. St. Louis, Mo., August 16, 17, 18 and 19.
1905. Cleveland, Ohio, August 15, 16, 17 and 18.
1906. New Haven, Conn., August 21, 22, 23 and 24.
1907. Kansas City, Mo., September 10, 11, 12 and 13.
1908. Philadelphia, Pa., September 8, 9, 10 and 11.
1909. Chicago, Ill., September 7, 8, 9 and 10.
1910. San Francisco, Cal., September 6, 7, 8 and 9.
1911. Toronto, Canada, August 21, 22, 23 and 24.
1912. Indianapolis, Indiana, August 27, 28, 29 and 30.
1913. New York, N. Y., September 1, 2, 3, 4 and 5.
1914. No meeting.
1915. Oakland, Cal., August 30, 31, September 1 and 2.

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PRESIDENTS

- 1863-1864. J. H. STICKNEY, Massachusetts.
- 1864-1865. A. S. COPEMAN, New York.
- 1865-1866. C. M. WOOD, Massachusetts.
- 1866-1867. R. H. CURTIS, New York.
- 1867-1869. R. WOOD, Massachusetts.
- 1869-1871. E. F. THAYER, Massachusetts.
- 1871-1875. A. LARGE, New York.
- 1875-1877. A. LIAUTARD, New York.
- 1877-1879. C. P. LYMAN, Massachusetts.
- 1879-1881. J. L. ROBERTSON, New York.

1881-1883.	W. BRYDEN, Massachusetts.
1883-1885.	W. B. E. MILLER, New Jersey.
1885-1886.	L. McLEAN, New York.
1886-1887.	A. LIAUTARD, New York.
1887-1889.	R. S. HUDEKOPER, Pennsylvania.
1889-1890.	C. B. MICHENER, New York.
1890-1892.	R. S. HUDEKOPER, Pennsylvania.
1892-1893.	W. L. WILLIAMS, Indiana.
1893-1896.	W. HORACE HOSKINS, Pennsylvania.
1896-1897.	F. H. OSGOOD, Massachusetts.
1897-1898.	D. E. SALMON, District of Columbia.
1898-1899.	A. W. CLEMENT, Maryland.
1899-1900.	LEONARD PEARSON, Pennsylvania.
1900-1901.	TAIT BUTLER, Indiana.
1901-1902.	J. F. WINCHESTER, Massachusetts.
1902-1903.	S. STEWART, Missouri.
1903-1904.	R. R. BELL, New York.
1904-1905.	M. E. KNOWLES, Montana.
1905-1906.	W. H. LOWE, New Jersey.
1906-1907.	JAMES LAW, New York.
1907-1908.	W. H. DALRYMPLE, Louisiana.
1908-1909.	J. G. RUTHERFORD, Ontario, Can.
1909-1910.	A. D. MELVIN, District of Columbia.
1910-1911.	G. H. GLOVER, Colorado.
1911-1912.	S. BRENTON, Michigan.
1912-1913.	J. R. MOHLER, District of Columbia.
1913-1915.	C. J. MARSHALL, Pennsylvania.
1915-1916.	R. A. ARCHIBALD, California.



SECRETARIES

1863.	A. LIAUTARD, New York.
1864.	R. JENNINGS, New York.
1865-1867.	C. BURDEN, New York.
1867-1869.	J. F. BUDD, New York.
1869-1874.	J. L. ROBERTSON, New York.
1874-1877.	J. D. HOPKINS, New Jersey.
1877-1880.	A. A. HOLCOMBE, New York.
1880-1888.	C. B. MICHENER, New York.
1888-1893.	W. HORACE HOSKINS, Pennsylvania.
1893-1894.	T. J. TURNER, Missouri.
1894-1895.	LEONARD PEARSON, Pennsylvania.
1895-1902.	S. STEWART, Kansas and Missouri.
1902-1906.	JOHN J. REPP, Iowa and Pennsylvania.
1906-1910.	RICHARD P. LYMAN, Connecticut and Missouri.
1910-1913.	C. J. MARSHALL, Pennsylvania.
1913-1915.	NELSON S. MAYO, Illinois.
1915-1916.	C. M. HARING, California.

OFFICERS, 1915-1916

PRESIDENT

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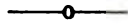
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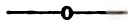
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BRACH, M. W., Hales Corners, Wis.
BRADLEY, CHAS. A., Marion, Ia.

- BRAGINTON, FRED, 1934 N. New Jersey St., Indianapolis, Ind.
(Mail returned).
- BRAINERD, E., Memphis, Mo.
- BRAISTED, WILLIAM, 235 E. 57th St., New York City. (Mail returned). 1913.
- BRANDENBERG, T. O., Lakota, N. D.
- BRANSON, ROSCOE ARTHUR, R. D. 1., Wichita, Kans.
- BRASHIER, EARL S., 2533 State St., Chicago, Ill.
- BRAZENALL, THOMAS, Bury, Que.
- BRAZIE, F. E., Harlan, Ia.
- BRAY, THOMAS A., Box 364, El Paso, Tex.
- BREED, C. S., 645 West 160th St., New York City.
- BREED, FRANK, Pearl River, N. Y.
- BRENTON, S., 121 West Alexandrine Ave., Detroit, Mich.
- BRENTON, WILLIS L., 224 Alexandrine Ave., W., Detroit, Mich.
- BRETT, GEO. W., 1636 30th St., N. W., Washington, D. C.
- BRIMHALL, S. D., Mayo Clinic Bldg., Rochester, Minn.
- BRONSON, ELY M., 2946 N. Capitol Ave., Indianapolis, Ind. 1913.
- BROOKBANK, ROSCOE E., Seville Apts., Washington, D. C.
- BROOKS, S. S., Hamilton Ave and 16th St., Brooklyn, N. Y.
- BROSSARD, G. J., Fiefield Row, Ashland, Wis.
- BROTHERIDGE, H. J., 3 16th St., Brooklyn, N. Y. 1913.
- BROUDE, HARRY F., 516 E. State St., Harrisburg, Pa. 1913.
- BROWN, ARTHUR C., 407 P. O. Bldg., San Francisco, Cal. (Mail returned). 1911.
- BROWN, ELDRIDGE N., 316 First Ave., N., Nashville, Tenn. 1910.
- BROWN, F. F., 1336 E. 15th St., Kansas City, Mo.
- BROWN, FRANK H., B. A. I., Danville, Ind.
- BROWN, HERBERT AUSTIN, Box 428, Victoria, B. C. 1910.
- BROWN, LYMAN D., S. Broadway, Hamilton, Mo.
- BROWN, SYLVESTER, 122 S. Union St., Traverse City, Mich.
- BROWNLEE, WM. F., Kirkwood, Ill.
- BROWNING, GEORGE W., Box 309, La Grange, Ga.
- BROWNING, P. H., 66 N. San Pedro St., San Jose, Cal.
- BRUNER, SAMUEL E., Live Stock Sanitary Board, Harrisburg, Pa.
- BRUNS, GEORGE H., 4 Live Stock Record Bldg., Union Stock Yards, Chicago, Ill.
- BRYANS, JOSEPH W. E., Lansford, N. D.
- BRYANT, ALBERT E., Menomonie, Wis.
- BUCHER, CLARENCE S., 1743 Warren Ave., Chicago, Ill. 1914.
- BUCHTEL, JOHN T., Lockhart, Texas. 1914.
- BUCK, JOHN M., B. A. I., Washington, D. C.
- BUCKINGHAM, DAVID E., 2115 14th St., Washington, D. C.
- BUCKLEY, JOHN M., 600 Carlton Ave., Brooklyn, N. Y. 1913.
- BUCKLEY, JOHN S., College Park, Md.
- BUCKLEY, SAMUEL S., College Park, Md. 1914.
- BUENCAMINO, VICTOR, 2229 Azcarraga, Manila, P. I.
- BULLER, JOHN J., 944 4th St., Santa Monica, Cal.

- BULLIVANT, JAMES, Spokane, Wash. 1914.
 BULLOCK, JOHN L., Creedmoor, N. C.
 BUNDY, EDWARD A., 2346 Hudson Ave., Ogden, Utah.
 BURDETT, CYRIL H., 5th and Commercial Sts., Centralia, Kans.
 BURKE, JAMES W., 2012 Canalport Ave., Chicago. (Mail returned) 1912.
 BURKHOLDER, CLINTON E., Chief Lake, Mich. 1911.
 BURKLAND, HERMAN W., 475 N. Boulevard Ave., Atlanta, Ga.
 BURLEY, ARTHUR JAMES, 2519 House St., Cheyenne, Wyo.
 BURNETT, J. F., care N. W. Mounted Police, Regina, Sask. 1910.
 BURNETT, SAMUEL H., 410 University Ave., Ithaca, N. Y.
 BURNHAM, F. E., 728 Ogden Ave., Superior, Wis.
 BURNS, ALBERT H., Hepler, Kans.
 BURNS, JOHN ROBERT, B. A. I., Live Stock Exch. Bldg., Chicago, Ill. 1912.
 BURR, ALEXANDER, Old Court House, Boston, Mass. 1914.
 BURROWS, SAMUEL, 2317 East 89th St., Cleveland, Ohio.
 BURSON, W. H., Athens, Ga.
 BURT, JAMES HENRY, 800 Poyntz Ave., Manhattan, Kans.
 BUSHNELL, FRED F., Harvard, Ill.
 BUSMAN, HERMAN, P. O., Bldg., South Side Station, Omaha, Nebr.
 BUTIN, GEORGE E., 1612 W. 16th St., Kansas City, Mo.
 BUTLER, GEORGE W., 315 Federal Bldg., Indianapolis, Ind.
 BUTTERFIELD, ORLIN F., Libertyville, Ill.
 BUTTERS, J., Box 335, Renville, Minn.
 BUTZ, FRANK R., 3116 Spring Grove Ave., Cincinnati, Ohio.
 BUZZARD, DAVID K., Nappanee, Ind.
 BYERRUM, ROSWELL O., 400 E. 2nd St., Muscatine, Ia.
 BYERS, M. V., Broken Bow, Nebr.
 BYRD, ATVILLE, 2406 E. 9th St., Kansas City, Mo.
 CADY, BERT J., Univ. of California, Berkeley, Cal.
 CADY, HENRY, 23 Washington St., Gloversville, N. Y.
 CADY, P. L., Fremont, Nebr.
 CAHILL, EDWARD A., Lowell, Mass.
 CAHILL, F. M., 9th and Mary Sts., St. Joseph, Mo.
 CALDWELL, FRED W., St. Joseph, Mo. (Mail returned). 1912.
 CALDWELL, J. H., 16 4th St., S. E., Medicine Hat, Alta.
 CALDWELL, WM. A., Edgewood, Cal.
 CALKINS, R. C., Fairbury, Ill.
 CALLICOTE, J. K., 2 East 4th St., Oklahoma City, Okla. 1913.
 CAMBON, FERDINAND J., 303 Perrin Bldg., New Orleans, La.
 CAMERON, ALNE EDWARD, 20 Shaa Road, Acton, London W., Eng.
 CAMPBELL, DELWIN M., 9 So. Clinton St., Chicago, Ill.
 CANT, W. JOHN, Erie, Ill.
 CARLE, EDWARD C., 2517 Lafayette St., St. Joseph, Mo. 1912.
 CARLISLE, T. S., 8425 Germantown Ave., Philadelphia, Pa. 1910.
 CARMACK, RALPH W., Dana, Ind.
 CARNEY, STEPHEN J., 266 Glisan St., Portland, Ore. 1913.

- CARNRITE, JAMES SCHUYLER, Fort Plain, N. Y.
CARROLL, THOS. B., 106 N. 2nd St., Wilmington, N. C.
CARROLL, THOS. E., 518 Wall St., Chico, Cal. 1910.
CARSON, JAMES R., Cicero, Ind. 1914.
CARSTENSON, L. P., Columbus, Nebr.
CARTER, ALVA B., Williamsport, Ind.
CARTER, BARCLAY FRED, 21 W. Fornance St., Norristown, Pa. 1912.
CARTER, E. B., Austin, Minn.
CARTER, GEO. H., 219 Tuscola St., Saginaw, Mich.
CARTER, JOSEPH E., 70 4th St., N., Fargo, N. D. 1914.
CARTER, ROLLA E., 619 Ohio Ave., Long Beach, Calif.
CARTER, R. W., Rancocas Stock Farm, Jobstown, N. J.
CASE, C. H., 50 E. Buchtel Ave., Akron, Ohio.
CASE, J. C., Peconic, Long Island, N. Y.
CASE, LEONARD N., Honolulu, T. H. 1913.
CASEY, CHARLES M., No. 307 Fabius St., Syracuse, N. Y.
CASPER, GEORGE T., 419 W. Fruit Ave., Albuquerque, N. M.
CASTOR, THOS., 4914 Frankfort Ave., Philadelphia, Pa.
CASH, GEO. B., 464 Bathurst St., Toronto, Ont.
CAVELLE, EDWIN B., Northville, Mich. 1912.
CAWLEY, A. O., Lewisburg, Pa.
CECIL, JOSEPH D., Waterloo, Ia.
CHAMBERLAIN, FRANK W., Box 1022, East Lansing, Mich.
CHAMBERLIN, LEROY MYLTON, 2503 Hamlin St., N. E., Washington D. C.
CHANDLER, GEORGE H., Marseilles, Ohio. 1912.
CHANNING, CHARLES E., Real Estate Trust Bldg, Washington, D.C.
CHAPMAN, GEORGE W., Webster, S. D.
CHASE, CHARLES S., Bay Shore, Long Island, N. Y.
CHENEY, ALONZO HENRY, Polson, Mont. 1914.
CHENEY, BAILEY E., Health Dept., Corpus Christi, Tex.
CHENEY, GEORGE LEROY, 265 Park Ave., New Haven, Conn.
CHERRINGTON, KENNETH G., 152 Webster St., Pawtucket, R. I. 1911.
CHESLEY, G. E., 215 Huntington St., Rochester, N. H. 1913.
CHISHOLM, JOSEPH P., Lisbon, N. D.
CHRISMAN, WM. G., Blacksburg, Va.
CHRISTIAN, ROBERT V., 1018 Houston St., Manhattan, Kans.
CHRISTIENSEN, JOSEPH C., Mt. Vernon, S. D. 1910.
CHRISTIENSEN, OREN A., 4319 Calumet Ave., Chicago, Ill.
CHRISTIE, NORMAN DOUGLAS, Box 616, Regina, Sask.
CHRISTOPHER, RALPH E., 423 Cass St., La Crosse, Wis.
CLANCY, J. B., Amberston Farm, Edgemont St'n., E. St. Louis, Ill.
CLARK, B. L., Monticello, Wis.
CLARK, CLARENCE W., Rice Lake, Wis.
CLARK, CURTIS ALFRED, College Corner, Ohio.
CLARK, DAVID BERT, Purdue Univ., Lafayette, Ind.
CLARK, HENRY D., 69 High St., Fitchburg, Mass.
CLARK, REES, Elberton, Ga. 1912.

- CLARK, ROY RALPH, Hampton Institute, Hampton, Va.
CLARK, W. G., Box 196, Marinette, Wis.
CLARK, BURNETT L., Monticello, Wis.
CLAWSON, C. A., 2445 Talbott Ave., Indianapolis, Ind.
CLAYTON, CHAS. E., 207 West 55th St., New York.
CLEMONS, W. E., Granville, Ohio.
CLERE, RALPH, W., E. Syracuse, New York.
CLEVELAND, EDGAR CHARLES, JR., Cattaraugus, N. Y.
CLEVELAND, WALTER J., Havelock, Ia.
CLIFFE, G. W., 119 West Johnson St., Upper Sandusky, Ohio.
CLINE, CLIFFORD, M., Box 298, Maryville, Mo.
CLINE, GORDON L., Western, Nebr. 1911.
CLINE, J. D., Clarion, Ia.
CLOSSON, GARDNER W., 131 Philadelphia St., Anaheim, Cal.
CLOSE, F. W., Lewiston, Ida.
COCHRAN, D. W., 19 Vestry St., New York City.
COCHRANE, ROBERT E., 450 Greenbush St., Milwaukee, Wis.
COFFEEN, ROBERT J., 225 North 2nd St., Stillwater, Minn.
COLE, ALONZO B., Montrose, Pa. 1912.
COLLETT, HOWARD BARKER, care of P. Burns & Co., Calgary, Alta.
COLLINS, FRANK, 320 N. 6th St., Monroe, La.
COLLINS, FRED W., Madison, Nebr.
COLLINS, GEORGE J., West Point, Nebr.
COLLINS, LEONARD, Stanton, Nebr.
COLLINS, ROBERT E., 256 Monroe St., Memphis, Tenn.
COLTON, CHAS. L., 99 Ann St., Hartford, Conn.
COMMINS, FREDERICK E., 119 Cortland Ave., San Francisco, Cal.
COMSTOCK, DAVID B., 175 Jay St., Albany, N. Y.
CONNOWAY, J. W., Univ. of Mo., Columbia, Mo.
CONNELL, CLARE V., N. 2nd St., Decatur, Ind.
CONRAD, BURTON W., Sabetha, Kans. 1914.
COOK, F. G., 220 S. Main St., Paris, Texas.
COOK, J. W., Brownsville, Ore.
COOK, L. P., 3116 Spring Grove Ave., Cincinnati, Ohio.
COOLEY, A. S., State Veterinarian, Columbus, Ohio.
COOPER, EDWARD, R. F. D., No. 3, Sunman, Ind.
COOPER, J. M., 711 Plum St., Cincinnati, Ohio.
COVER, W. E., Indianapolis, Ind. (Mail returned). 1912.
COPITHORN, HARRY K., Chelsea, Mass.
CORBIN, CECIL J., Pawling, N. Y.
CORBIN, E. A., Tucumcari, N. M. 1912.
CORCORAN, MICHAEL, Box 142, Augusta Kans.
CORN, SAMUEL, 5518 Market St., Philadelphia, Pa. 1913.
CORNMAN, ERNEST L., Marietta, Pa.
COWIN, GEORGE E., Canaan, Conn.
COWIN, WILLIS T., Pine Island, Minn.
COPFORD, SAMUEL E., Box 322, Beatrice, Nebr.
COTTON, CHAS. E., 615 4th Ave., Minneapolis, Minn.

- COTTON, WM. E., 3242 38th St. N. W., Washington, D. C.
COTTRILL, R. B., Sand Fork, W. Va.
COURTRIGHT, JOHN M., Lathrop, Mo.
COUTURE, J. A., 49 Garden St., Quebec, Can.
COWGILL, DANIEL L., Rio, Wis.
COX, ABRAHAM G., Carlisle, Ind.
COX, HARRY B., 1516 Snyder Ave., Philadelphia, Pa. 1914.
COX, WALTER P., 7 N. Carey St., Baltimore, Md.
COX, WALTER R., Clio, Mich.
COXE, S. A., 140 9th St., Brandon, Man., Can.
COZIER, CARL, 320 Prospect St., Bellingham, Wash.
CRAIG, ROBERT A., 621 Owen St., Lafayette, Ind.
CRAIG, THOMAS F., Hampden, N. D.
CRAIG, W. B., 216 Meridian St., Indianapolis, Ind. 1914.
CRANE, ADELBERT G., 1639 Wabash Avenue., Chicago, Ill.
CRAM, V. E., Calexico, Cal. 1912.
CRANWELL, JOHN JAMES, 642 West Pike St., Clarksburg, W. Va.
CRAWFORD, HARRY C., 38 Lexington Ave., New York, N. Y.
CRAWFORD, J. H., Harvard, Ill. 1913.
CRAWFORD, JAMES E., Far Rockaway, Long Island, N. Y.
CREAMER, J. M., 5th and Taylor St., Portland, Ore.
CREECH, G. TINSLEY, 4193 S. Halstead St., Chicago, Ill.
CREWE, W. F., Bismarck, N. D.
CRISLER, OTTO S., 209 E. 4th St., Newport, Ky.
CROCKER, WALTER JAMES, 39th & Woodland Ave., Philadelphia, Pa.
CULVER, FREDERICK W., Longmont, Colo.
CUMMING, DAVID, Port Huron, Mich. (Mail Returned). 1911.
CUNNINGHAM, A. E., 3826 Carnegie St., S. E., Cleveland, O.
CUNNINGHAM, ELMER E., 106 Indiana Ave., Valparaiso, Ind. 1913.
CURRAN, MATTHEW JOHN, 39 N. 6th St., New Bedford, Mass.
CURRY, J. M., 995 Main St., Hartford, Conn. 1911.
CURTICE, COOPER, U. S. Sheep Farm, R. R. No. 2, Vienna, Va.
CURTIS, WILBUR A., Plainview, Tex.
CUSACK, FRANK L., Carrington, N. D.
CUSTIS, HOWARD H., La Jara, Colo.
DALRYMPLE, W. H., Baton Rouge, La.
DAMMAN, ARTHUR J., 749 12th Ave. E., Vancouver, B. C., Can.
DANFORTH, ARTHUR L., 103 Orchard St., Watertown, N. Y.
DANIELSON, LEOPOLD A., Madera, Cal.
DARRAH, GEORGE D., 648 Hall St., Manchester, N. H.
DARROW, JOHN HENRY, JR., 78 N. Hamilton St., Poughkeepsie, N. Y.
DAUBER, CHAS. C., 107 N. Clay St., Sturgis, Mich.
DAUBIGNY, F. T., 12 Rue St. Denis, Montreal, Que. 1914.
DAUGHERTY, T. E., Danville, Ind. 1913.
DAUTH, ALBERT, Coteau, DuLac, Que. 1910.
DAVENPORT, MILES L., Fergus Falls, Minn.
DAVIDSON, GEORGE H., Rugby, N. D.
DAVIDSON, WILLIAM A., Exchange Bldg., S. St. Joseph, Mo.

- DAVIS, BENJAMIN F., Box 509, Douglas, Wyo.
DAVIS, HARRY EMERSON, Arlington, S. D.
DAVIS, J. E., Hume, Ill. 1912.
DAVIS, WILLIAM L., B. A. I., S. Omaha, Nebr. (Mail Ret.) 1914.
DAVISON, ELWIN T., Athenia, N. J.
DAVITT, M. H., 525 N. Main St., Palmer, Mass.
DAWDY, CLARENCE A., Brawley, Cal. 1912.
DAY, FRANK J., 50 Rhode Island Ave., N. W., Washington, D. C.
DAY, L. ENOS., 4193 S. Halstead St., Chicago, Ill.
DEADMAN, CHARLES A., 311 E. Main St., Madison, Wis.
DECKER, E. J., 16 William St., Far Rockaway, Long Island, N. Y.
DEILING, N. J., Dallas Center, Ia.
DELL, JESSE APPLIN, 16th and Pacific Aves., Los Angeles, Cal.
DELLERT, R. V., 568 Banning St., Winnipeg, Can.
DEMING, CHARLES W., Great Falls, Mont., Box 1287. 1912.
DEMING, S. A., Ida Grove, Ia.
DEMOTT, LEE, Petersburg, Ind.
DENISON, WILLIAM K., Bemidji, Minn.
DERONDE, JOHN D., 48 East 89th St., New York City.
DESERPA, JOHN A., Box 614, Oxnard, Cal.
DESMOND, J., 77 Currie St., Adelaide, S. Australia (Deceased).
DEUBLER, ERNEST C., Wayne, Pa.
DEUBLER, EZRA S., Narberth, Pa.
DEVEREAUX, JOHN L., 20 Brook St., Waterbury, Conn.
DEVINE, JOHN F., Goshen, N. Y.
DICK, GEORGE A., Kane, Pa.
DICKY, GEO. W., 319 N. Weber St., Colo. Springs, Colo.
DICKSON, JOHN, 444 Federal Bldg., Denver, Colo.
DILL, BENNIE G., Charleston, S. C. (Deceased Sept. 17, 1915).
DILLAHUNT, PETER A., Springfield, Ohio, R. F. D. No. 7.
DILLON, L. RAY, 107 N. Grand Ave., Pueblo, Colo.
DIMOCK, WM. WALLACE, Iowa State College, Ames, Ia.
DINGLEY, ERNEST C., 5335 DeLancey St., Philadelphia, Pa.
DINWIDDIE, R. R., Ft. Smith, Ark. 1912.
DINWOODIE, JOHN T. E., Brookings, S. D.
DITTEWIG, GEORGE, B. A. I., Washington, D. C.
DITTO, JOHN K., Pleasureville, Ky.
DIVINE, JOHN P., Ballston, Va. 1914.
DIXON, C. PRICE, Old Fire House, Charlottesville, Va. 1914.
DIXON, H. L., Box 616, Regina, Sask, Can.
DOBBINS, QUINCY C., Bedford, Ind.
DOBSON, CHARLES C., Muncie, Ind.
DODGE, GEORGE A., Northwood, Ia. 1911.
DODGE, WILLIAM H., Leominster, Mass.
DOLAN, FRANCIS F., Willow City, N. D.
DONALD, JAMES S., 213 S. Catherine St., Bay City, Mich.
DONNELLY, GEORGE J., 833 Telegraph Ave., Oakland, Cal.
DONOHUE, ROBERT JOHN, 506 Alaska Bldg., Seattle, Wash.

- DORAN, JOHN THOMAS, Beatrice, Nebr.
DORIAN, FRANK P., 35 Franklin St., Yonkers, N. Y.
DOUGLASS, FRANK J., 1235 St. Andrew, New Orleans, La.
DOYLE, SIMON A., 1764 Mission St., San Francisco, Cal. 1913.
DRAKE, EDW. J., Toledo, Wash. (Mail returned). 1914.
DRAKE, M. W., 1308 Morris, Philadelphia, Pa.
DRAPER, JAMES POWELL, Lowell, Mich.
DREHER, WM. HENRY, Box 143, Oregon, Wis.
DREPPARD, SAMUEL G., Flora, Ill.
DREXLER, JOSEPH L., Thibodaux, La.
DRURY, JAMES, 218 Michigan St., Ypsilanti, Mich.
DUFRESNE, A. A., Longueuil, Quebec, Can.
DU FRENE, ALFRED J., Glendive, Mont.
DU JARDIN, GUILLAUME, 270 Craig St., E., Montreal, Que. 1914.
DUNLEAVY, M. J., 1324 Acoma St., Denver, Colo.
DUNN, RALPH C., College Station, Tex.
DUNPHY, G. W., East Lansing, Mich.
DUSTAN, HENRY W., 25 DeHart St., Morristown, N. J.
DYKSTRA, RALPH R., 714 Houston St., Manhattan, Kan.
DYSON, ORION E., State Veterinarian, Springfield, Ill.
EGAN, PAUL HERMAN, 817 N. 7th St., East St. Louis, Ill.
EAGLE, ALEX. F., 725 San Jose Ave., San Francisco, Cal.
EAGLE, JOHN G., 3924 Morrel Ave., Kansas City, Mo.
EAGLE, RICHARD F., 1309 N. Ellison St., Oklahoma City, Okla.
EAGLE, WM. W., 3rd and Central Ave., Kansas City, Kan.
EASTMAN, O. R., Gadsden, Ala.
EBBITT, RICHARD, Naper Arms, Old Castle, C. Meath, Ireland.
ECKERT, HENRY F., Markesan, Wis.
EDELIN, ALLEN ALFRED, 1602 Lagonda St., Fort Worth, Tex.
EDGINGTON, BRUCE H., Reynoldsburg, Ohio.
EDMONDS, ELMER V., 603 Lincoln Ave., Mt. Vernon, Wash.
EDMUNDS, ARTHUR L., Franklin, N. H.
EDWARDS, FRANK, Bureau of Agriculture, Manila, P. I.
EDWARDS, IRA W., Box 82, Stuart, Iowa.
EDWARDS, W. R., Box 216, Vicksburg, Miss.
EGAN, JOHN MILTON, 1155 Golden Gate Ave., San Francisco, Cal.
EGAN, PETER J., 1155 Golden Gate Ave., San Francisco, Cal.
EGAN, WILLIAM F., 1155 Golden Gate Ave., San Francisco, Cal.
EGBERT, ARCH, 411 E. 4th St., Logan, Utah. 1911.
EICHELBERGER, A. MARTIN, Box 488, Spring and Milan Sts.
Shreveport, La.
EICHORN, ADOLPH, B. A. I., Washington, D. C.
EISEMAN, FRANK T., 222 East Main St., Louisville, Ky. 1913.
EISENHOWER, ELMER C., Gypsum, Kans.
EISENHOWER, JAMES M., Schell City, Mo.
EISENLOHR, HERMAN M., Larimore, N. D.
ELERY, WILTON, Audubon, Ia.
ELIASON, OSCAR H., State Veterinarian, Madison, Wis.

- ELKIN, ALBERT F., R. F. D. No. 1., Smicksburg, Pa.
ELKIN, JOSEPH HOMER, Smicksburg, Pa.
ELLENBERGER, W. P., 1359 Parkwood Place., Washington, D. C.
ELLIOTT, ADAM F., Milton, N. D.
ELLIOTT, CHAS. M., Seward, Nebr.
ELLIOTT, CLARENCE L., 5434 S. 3rd St., So. St. Joseph, Mo.
ELLIOTT, EDWARD W., Park River, N. D.
ELLIOTT, HAROLD B., P. O. Box 167, Hilo, Hawaii.
ELLIS, ROBERT W., 509 W. 152nd St., New York City.
ELLIS, PERCY L., Box 272, Merrill, Ia.
ELSEY, MARK A., Marion, Ohio.
ELWELL, FRED N., National Stock Yards, St. Claire Co., Ill.
ELZINGA, MARTIN E., 349 La Grave Ave., Grand Rapids, Mich.
EMBREE, WARREN J., Aberdeen, S. D. (Mail returned). 1911.
ENGEL, JOHN H., 1311 Harford Ave., Baltimore, Md. 1912.
ENGLE, FRANK PHILLIP, Ft. Worth, Tex. (Mail returned). 1913.
ERNST, JOHN, JR., 125 East 4th South St., Salt Lake City, Utah.
ESSEX, JOHN J., Chevy Chase, Md.
ESTEY, CYREW B., Box 287, St. Cloud, Minn.
ETIENNE, ALBERT A., 67 Drummond St., Montreal, Can.
ETTLING, CHRISTIAN C., 910 3rd St., E. Las Vegas, N. M. 1911.
EVANS, CHRISTMAN E., 719 Wisconsin St., Racine, Wis.
EVANS, CALVIN S., 323 Exchange Bldg., Sioux City, Ia. 1911.
EVERETT, A. T., 24th and North Sts., So. Omaha, Nebr.
EWALT, W. AUSTIN, 22 Grand Ave., Mt. Clemens, Mich.
EXLINE, JAMES C., 311 Live Stock Ex. Bldg., Denver, Colo.
FABIAN, ARTHUR H., 421 Walworth St., Lake Geneva, Wis.
FAIR, J. D., Millersburg, Ohio.
FAKE, CHARLES THOMPSON, Granville, N. Y.
FALCONER, THOMAS, Box 303, Alexandria, Minn.
FALLON, EDWARD J., 3372 A 16th St., San Francisco, Cal.
FARLEY, A. J., 873 Towne Ave., Pomona, Cal.
FARMER, ALBION C., Berlin, N. H.
FARMER, THOMAS, Grand Blanc, Mich.
FARRINGTON, A. M., 1436 Chapin St., Washington, D. C.
FAUST, OTTO, 209 Union Ave., Poughkeepsie, N. Y.
FAVILLE, G. C., North Emporia, Va. 1913.
FEELEY, ROBERT O., Clemson College, S. C.
FEIST, ARNOLD ANDREW, 156 Aurora Ave., St. Paul, Minn.
FERGUSON, CHAS. W., Auburn, Ala.
FERGUSON, THOMAS H., 421 Broad St., Lake Geneva, Wis.
FERGUSON, W. P., 316 Second St., Grenada, Miss.
FERNEYHOUGH, JAMES G., Oak St., Burkville, Va. (Mail returned). 1914.
FERNEYHOUGH, R. E., Warrenton, Va., Lee St.
FERNISLER, FRANK U., 32 South 7th St., Lebanon, Pa.
FERRAND, WILLIAM S., Gilmore City, Ia.
FERRO, R. B., Gordon Hotel, Lafayette, La.

- FETHEROLF, GEO. R., Reading, Pa. 1914.
FINDLAY, ALEXANDER, 11 Main St., Camden, N. Y. (Mail returned). 1912.
FINKLE, RAY C., Seymour, Wis.
FINLEY, LESTER C., Lapel, Ind.
FISCHER, CARL F., Garden City, Mo.
FISCHER, HERMAN C., Bellair, Mich. 1912.
FISCHER, PAUL, Reynoldsburg, Ohio.
FISH, PIERRE A., N. Y. State Vet. Col., Ithaca, N. Y.
FISHER, ADAM, 9 West 4th St., Charlotte, N. C.
FISHER, CARL W., 420 A St., San Mateo, Cal.
FISHER, D. Grandin, N. Dak.
FISHER, LAWRENCE W., Bureau of Agriculture, Manila, P. I. 1912
FISK, ALEXANDER G., 815 Willow St., Trinidad, Colo.
FITCH, CLIFFORD PENNY, 107 Brandon Place, Ithaca, N. Y.
FITCH, EARL W., Arcade, N. Y.
FITZPATRICK, DENNIS B., 3225 Woodland Ave., Philadelphia, Pa.
FLAHERTY, JAMES J., 127 Meadow St., New Haven, Conn. 1913.
FLANARY, W. F., St. Charles, Minn.
FLEMING, CHARLES I., 20 West 5th St., Terre Haute, Ind. 1912.
FLEMING, W. B., 12 Washington St., Montgomery, Ala. 1911.
FLEMING, W. R., 25 Live Stock Exchange, Buffalo, N. Y. 1913.
FLOCKEN, CHARLES F., Experiment Station, St. Anthony Park, Minn.
FLOWER, E. PEGRAM, Box 24, Baton Rouge, La.
FLOWERS, ROYAL G., 3rd and Main Sts., Ft. Worth, Tex.
FOGLE, CHARLES W., Leipsic, Ohio.
FOLSE, CHARLES D., 1336 E. 15th St., Kansas City, Mo.
FOLSOM, EDWARD GRAHAM, Watson Bldg., Fairmount, W. Va.
FOOS, ARTHUR C., 126 N. Laurel St., Hazleton, Pa.
FORBES, S. D., 301 Cameron St., Alexandria, Va.
FORGE, LOUIS A., 561 Washington St., Burlington, Wis.
FORMAD, ROBERT J., B. A. I., Washington, D. C.
FOSBINDER, HARRY R., 1622 Cosmo St., Hollywood, Cal.
FOSTER, ALLEN A., 3813 Ross Ave., Dallas, Tex.
FOSTER, FRED, 2nd Field Artillery, Vancouver Barracks, Wash. 1910.
FOSTER, J. D., 126 N. State St., Newtown, Pa.
FOSTER, JOAB P., Box 27, Bangor, Me.
FOSTER, ROBERT J., 9th U. S. Cavalry, Manila, P. I.
FOSTER, SAMUEL B., 927 Union Ave., North, Portland, Ore.
FOSTER, THOMAS J., Monticello, Ill.
FOWLER, W. J. R., 52 Pacific Ave., Toronto, Ontario, Can.
FOX, DAVID F., Room 423 First Nat'l Bank Bldg., Oakland, Cal.
FRANCIS, M., College Station, Tex.
FRANCOISE, WM. I., 605 East Ave., Kalamazoo, Mich. 1914.
FRANK, JOHN WILLIAMSON, Box 291, Nelson, B. C.
FRANZMAN, PETER A., 5966 Lowe Ave., Chicago, Ill.

FRASER, THOMAS, 316 N. Henry St., Richmond, Va.
FRASER, WALTER, 13th U. S. Cavalry, Marfa, Tex.
FRAZIER, CHAS., 5052 Cottage Grove Ave., Chicago, Ill.
FREDERICK, CHARLES B., 412 N. Walnut St., N. E., Canton, Ohio.
1914.

FREDERICK, HARRY, Box 584, Suffern, N. Y.
FREDERICK, HYRAM, J., College Hill, Logan, Utah.
FREDERICKS, WM. J., Franklin Ave., Delawanna, N. J. 1912.
FREED, B. M., 12 South Dock St., Sharon, Pa.
FREEMAN, F. E., Buhl, Ida.
FRENCH, ALEX. W., Cheyenne, Wyo.
FRENCH, WM. HAROLD, Redfield, S. D. 1913.
FRESE, GEORGE L., 309 11th St., Toledo, Ohio.
FREY, CHARLES T., Box 106, River Point, R. I.
FRIEDHEIM, LOUIS, Box 103, Rock Hill, S. C.
FRIDIRICI, ULYSES G., 204 Pine St., Tamaqua, Pa.
FROST, JAMES N., 919 East State St., Ithaca, N. Y.
FROST, ROY C., 1513 U. St., N. W., Washington, D. C.
FROTHINGHAM, LANGDON, 335 Bay State Road, Boston, Mass.
FULLER, CLAUDE E., Beach, N. D.
FULLER, GEORGE S., 170 Common St., Lawrence, Mass.
FULLER, GEORGE S., 1715 N. 12th St., Philadelphia, Pa.
FULLER, JOHN RUSSEL, 101 W. Commercial St., Weiser, Ida.
FULLINGTON, HARRY C., 6047 Greenwood Ave., Seattle, Wash.
1913.

FULSTOW, HARRY, Norwalk, Ohio.
FUNKHOUSER, GEORGE M., 410 Main St., Lafayette, Ind.
GAIN, J. H., State Farm, Lincoln, Nebr.
GAINES, CHAS. H., Chilhowee, Mo.
GALL, WM., Mattawan, N. J.
GALLAGHER, BERNARD A., B. A. I., Washington, D. C.
GALLAGHER, JOHN J., Western Ave., Lovelock, Nev.
GALLIVAN, MICHAEL V., P. O. Box 567, Lethbridge, Alberta.
GALLOWAY, PETER F., 318 N. Henry St., Richmond, Va.
GAMBLE, HENRY S., 1329 Gallatin N. W., Washington, D. C.
GAMRATH, CARL L., 52 E. Washington St., Fairfield, Ia.
GANNETT, RAY WILLARD, 186 Sterling Ave., Brooklyn, N. Y.
GARDNER, CHENNIE A., Morris, N. Y.
GARSDIE, PETER, Bourbon, Ind.
GATES, WM. L., Clarksdale, Miss.
GAY, CARL W., Swarthmore, Pa.
GEARHART, FRANK C., Bureau of Agriculture, Manila, P. I., Box
1362.

GEMMILL, A. D., 220 E. Livingston St., Celina, Ohio.
GEORGE, HARRISON H., 235 Federal Bldg., Cleveland, Ohio.
GEORGE, HERBERT H. S., Kamloops, B. C.
GERLACH, G. H., Morenci, Mich. 1913.
GIBSON, A., 1617 2nd St., Birmingham, Ala.

- GIBSON, HOWARD RENWICK, Algona, Ia.
GIBSON, G. D., Adrian, Mich.
GIBSON, JAMES IRVINE, State House, Des Moines, Ia.
GIFFEE, JOE W., (1816 Missouri Ave.) South Side Station, Omaha, Nebr.
GILCHRIST, WM. T., 410 Church St., Norfolk, Va.
GILES, WALTER M., Franklin, Tenn.
GILL, H., 337 E. 57th St., New York City.
GILL, JOSEPH C., 2nd and Main Sts., Clarksville, Tenn. 1910.
GILLESPIE, JOHN F., 446 Hudson Ave., Brooklyn, N. Y.
GILLIE, PETER T., 22 E. First St., Mansfield, Ohio.
GILLILAND, S. H., Marietta, Pa.
GILTNER, L. T., Box 3, Bismarck, N. D.
GILTNER, WARD, East Lansing, Mich.
GILYARD, ARTHUR T., 74 Phoenix Ave., Waterbury, Conn.
GIMPER, W. S., Live Stock Sanitary Board, Harrisburg, Pa.
(Mail returned). 1912.
GLEASON, MATTHEW E., Fowlerton, Tex.
GLENENNING, C. G., 115 W. Washington St., Clinton, Ill.
GLENNON, HENRY J., 148 Second St., Newark, N. J.
GLENNON, JAMES T., 27 Clay St., Newark, N. J.
GLOVER, ALBERT D., Newark, Mo.
GLOVER, GEORGE H., Fort Collins, Colo.
GLYNN, LAWRENCE L., 444 Federal Bldg., Denver, Colo.
GOHN, HORACE M., St. Johns, Mich.
GOLDING, CYRIL, Tulare St., Dinuba, Cal.
GOODWIN, JAS. ARTHUR, Lock Box 584, New Iberia, La.
GOODWIN, PERCY W., Wrights, Cal.
GORDON, GEORGE, Hanford, Cal.
GORDON, GEORGE, Gibson City, Ill.
GORDON, WALDRON M., 1513 6th Ave., Sioux City, Ia. 1912.
GORDON, WILLIAM D., 268 West Santa Clara St., San Jose, Cal.
GORE, TRUMAN E., 111 W. Pike St., Clarksburg, W. Va.
GORSUCH, DICKINSON, Glencoe, Md.
GOSS, LEONARD W., Agricultural College, Manhattan, Kans.
GOULD, J. H., 2nd F. A., Manila, P. I.
GOULD, J. N., Worthington, Minn.
GOW, RONALD M., State Veterinarian, Old State House, Little Rock, Ark.
GRADY, WILLIAM J., Lankin, N. D. 1914.
GRAF, JOHN, 2nd Ave., West, Cresco, Ia.
GRAFF, CARL L. P., Bisbee, N. D.
GRAHAM, G. G., 1228 Main St., Kansas City, Mo.
GRAHAM, JAMES, 115 Queen St., Germantown, Philadelphia, Pa.
GRAHAM, JOHN J., West Queen Lane, Germantown, Pa. 1914.
GRAHAM, LEROY B., 369 S. 18th St., Cedar Rapids, Ia.
GRAHAM, OSWALD HOOD, Clinton, N. C.
GRAHAM, RALPH, National Stock Yards, Ill. 1911.

- GRAHAM, ROBERT, Experiment Station, Lexington, Ky.
GRAPP, GUSTAV H., Port Deposit, Md.
GRANGE, E. A. A., Ontario Vet. College, Toronto, Ont., Can.
GRAU, JEPPE ANDREW, Tecumseh, Neb.
GRAVES, FRED W., New Richmond, Ind. 1912.
GRAVES, HENRY T., E. 201 15th St., Olympia, Wash.
GRAY, FRED SUMNER, Box 561, Miles City, Mont.
GRAYBILL, GUY M., Milford Square, Pa.
GRAYBILL, HARRY W., 1021 Daisy Ave., Long Beach, Cal.
GREEDER, HERMAN, Elkhorn, Wis.
GREEN, L. KENNETH, 37 Knight St., Auburn, Maine.
GREER, JOHN, Saranac Lake, N. Y.
GREESON, J. O., Kokomo, Ind.
GRIFFITH, J. W., Cedar Rapids, Ia.
GRIFFITH, ROSCOE C., Jamestown, Ohio.
GROFF, BENJAMIN WARREN, 20 North St., Massillon, Ohio.
GROGAN, JOSEPH P., 909 Ashland Ave., Baltimore, Md.
GROSS, JNO. L., Bureau of Agriculture, Manila, P. I.
GROSS, R. C., Elizabethtown, Pa.
GROSSMAN, JAMES D., 117 Ash Ave., Ames, Iowa.
GROVE, JNO. S., 310 Federal Bldg., Oklahoma, Okla.
GROVER, ARTHUR L., 65 9th Ave., New York City. 1914.
GROVES, JOHN W., 40 York St., Hamilton, Ont.
GRUBB, CHAUNCEY M., Box 202, Rockville, Md.
GRUBER, JOHN T., 316 N. Main St., Marion, Ohio.
GRUENEWALD, GEO. J., B. A. I., Federal Bldg., Cleveland, Ohio.
GRUNER, WALTER H., 225 Mary St., Evansville, Ind. 1912.
GRUTZMAN, WALTER R., Ft. Bliss, Tex. 8th Cavalry.
GUARD, WILLARD F., Veterinary College, Ames, Ia.
GULDAGER, FRED HOWARD, 304 Ridge St., Sacramento, Cal. 1913.
GUYSelman, P. C., Monte Vista, Colo.
GYSEL, ROBERT, 9333 Escanaba St., Chicago, Ill.
HADLEY, FREDERICK B., Univ. of Wis., Madison, Wis.
HADWEN, SEYMOUR, Agassiz, B. C.
HAFFER, JOHN W., 49 Pearl St., Paterson, N. J.
HAINES, W. ALBERTSON, Bristol, Pa.
HALL, ADRIAN V., Oxford, Pa. 1910.
HALL, ORLAN, Health of Animals Branch, Ottawa, Ont., Can.
HALLIDAY, ROBERT J., 21 West 32nd St., Bayonne, N. J.
HALLMAN, ELAM T., 383 Sunset Lane, East Lansing, Mich.
HALLORAN, JOHN L., Broad St., Stapleton, Staten Island, N. Y.
HALLQUIST, RALPH A., Box 182, Oslo, Minn.
HALSTED, WILLIAM E., 19 Judson St., Binghamton, N. Y.
HALTON, JOHN H., 123 G. St., Salt Lake City, Utah.
HALVERSON, HAROLD M., Box 354, Yankton, S. D.
HAMBLET, C. A., 495 Varnum Ave., Lowell, Mass.
HAMILTON, GEORGE W., 604 N. 10th St., E. St. Louis, Ill.
HAMILTON, HERBERT B., 79 Hillman St., New Bedford, Mass.

- HAMILTON, HOWARD M., Paris, Ky.
HAMILTON, M., 364 Main St., Delhi, N. Y.
HAMILTON, ROBERT, 1420 Fort St., Victoria, B. C. 1913.
HAMILTON, WM. C., Union Stock Yards, Chicago, Ill. (Mail returned). 1912.
HAMMOND, HARRY J., Box 338, Sacramento, Cal.
HANAWALT, DAVID C., Laurel, Miss. 1912.
HANDLEY, JOHN ISAAC, Box 8, West Raleigh, N. C.
HANDLEY, JNO. M., Woodworth, Wis.
HANEY, W. F., 1518 Ninth St., Modesto, Cal.
HANNA, ROBERT LEE., Brookville, Ind. 1912.
HANSEN, HANS P., 216 E. Mill St., Austin, Minn.
HANSEN, JAMES W. G., 511 N. Lafayette St., Greenville, Mich.
HANSEW, E., 125 Carlton Ave., Brooklyn, N. Y.
HANSON, H. D., Darien, Conn.
HANVEY, GEORGE A., 5th Cavalry, Harlingen, Tex.
HARDENBERG, JAMES BALL, 39th and Woodland Ave., Philadelphia, Pa.
HARDMAN, RUSSELL T., Kyger, W. Va.
HARGRAVE, J. C., Dominion Vet. Inst., Medicine Hat, Alta.
HARING, C. M., Div. of Vet. Science, Univ. of Cal., Berkeley, Cal.
HARKINS, MALCOMBE J., care H. K. Mulford Co., Glenolden, Pa.
HARMS, HERBERT F., Pearl River, Rockland Co., N. Y. 1912.
HARRIES, THOS. B., 22nd Divisional Train, B. E. F., France.
HARRINGTON, E. T., 873 Broadway, S. Boston, Mass. 1911.
HARRIS, A. W., 78 Fourth Ave., Ottawa, Can.
HARRIS, E. D., Casselton, N. D.
HARRIS, J. G., Duluth, Minn. 1912.
HARRISON, JAMES V. S., 120 South Pitcher St., Kalamazoo, Mich.
HARRISON, W. F., 329 Broad St., Bloomfield, N. J.
HARRY, CHARLES EDWARD, Anita, Ia.
HARSH, FRANCIS A., 326 Murray Ave., Minerva, Ohio.
HART, CHARLES HENRY, Hankinson, N. D.
HART, GEORGE H., Health Office, City Hall, Los Angeles, Cal.
HART, JOHN P., Winchester, Ind. 1913.
HART, WM. J., Wetmore, Kans.
HARTHILL, ALEXANDER, 707 Green St., Louisville, Ky. 1914.
HARTMAN, THOS. T., 1027 Ann St., Kansas City, Kan. 1910.
HARTMAN, WM. J., State College of Agriculture, Bozeman, Mont.
HASSELBALCH, A. E., St. Edward, Nebr. 1914.
HASSLOCH, AUGUST, 400 West 50th St., New York City, N. Y.
HATTERSCHEID, CHAS. A., Aberdeen, S. D. 1910.
HAWKE, WALTER L., Lethbridge, Alta.
HAWKE, WILLIAM RICHARD, Medicine Hat., Alta. 1912.
HAWKINS, JOSEPH, 184 Stanton Ave., Detroit, Mich. 1913.
HAWORTH, CHARLES C., Donnellson, Ill.
HAXBY, J. W., 6th St., and 3rd Ave., Clarinda, Ia.
HAY, LEOPOLD, 5th and 1st Ave., Fairbault, Minn.

- HAYDEN, CHARLES ERNEST, 108 Irving Place, Ithaca, N. Y.
HAYES, FRED M., Univ. Farm, Davis, Cal.
HAYES, JESSE, Alexandria, Va.
HAYES, JOHN J., 7 E. 42nd St., New York City.
HAZEL, GEORGE A., 113 East 83rd St., New York City. 1913.
HAZLET, SAMUEL K., Oelwein, Ia.
HAZLEWOOD, ROBERT V., Bessemer, Ala.
HEACOCK, CLYDE C., Carlsbad, N. M. 1913.
HEAD, CHARLES, Regina, Sask., Can. 1911.
HEALEY, THOMAS W., 461 North 2nd St., San Jose, Cal.
HEATH, WARREN E., Columbus, Mont.
HEATON, JOHN B., Indianapolis, Ind. (Mail returned). 1912.
HECKER, FRANK, 1108 Jefferson Co. Savings Bk. Bldg., Birmingham, Ala.
HEDLEY, CLARK, Marion, S. C.
HEDRICK, HORACE A., 2606 Gilford Ave., Baltimore, Md.
HEER, RUFUS S., 115 4th St., Platteville, Wis.
HEINY, EDGAR, Hattiesburg, Miss.
HELMER, JACOB, 327 Madison Ave., Scranton, Pa.
HEMMY, CHRISTIAN D., New London, Wis. 1910.
HEMNEBERGER, W. B., Portland, Ore. (Mail returned). 1914.
HEMPHILL, JOHN F., 428 Dexter St., Clay Center, Kans.
HENDERSON, LEVI C., Twin Falls, Ida.
HENDREN, OLIVER T., 6645 Ridge Ave., Philadelphia, Pa.
HENDREN, S. G., 17 E. Market St., Lewiston, Pa.
HENNESSY, WILLIAM J., 126 Front St., Worcester, Mass.
HENRICH, LEO O., Vacaville, Cal.
HERBOTT, JULIUS W., 1336 N. Marshall St., Philadelphia, Pa.
HERNSHEIM, J. T., 6222 Lakewood Ave., Chicago, Ill.
HERR, T. J., 381 E. 83rd St., New York City.
HERRING, LAWRENCE JAMES, Wilson, N. C.
HERRON, MOORE BRYANT, 1282 Pike St., Canonsburg, Pa.
HERSHEY, CHAS. E., Tiffin, Ohio.
HERSHEY, SAMUEL E., Lock Box 283, Charleston, W. Va.
HESS, ORLANDO B., Dept. of Agriculture, Washington, D. C.
HICKMAN, D. ELWYN, 333 W. Union St., West Chester, Pa.
HICKMAN, THOMAS S., 1818 Cherry St., Kansas City, Mo.
HICKS, HAZEN H., 105 Custom House Bldg., San Francisco, Cal.
HICKS, TUNIS, 642 Irving St., Washington, D. C.
HICKS, THOS. H., Milbank, S. D. 1911.
HIDAY, JOHN L., Fortville, Ind.
HIGGINS, CHARLES H., Experimental Farm, Ottawa, Ont., Can.
HILL, ANSON HARRIS, Brookings, S. D. 1911.
HILL, GEORGE H., Atkinson, Ill.
HILL, JAMES, Tarlac, Tarlac Province, P. I.
HILL, JAMES ANDERSON, 2609 E. 14th St., Oakland, Cal. 1910.
HILL, JOSEPH G., Skaneateles, N. Y. 1913.
HILL, ROBERT C., West Alexandria, Ohio.

- HILL, WM. PROCTOR, Ft. Riley, Kans. (Mail returned). 1912.
HILLIARD, WILLIAM A., 630 McMillan Ave., Winnipeg, Man.
HILTON, GEORGE, 126 Lewis St., Ottawa, Ont., Can.
HILTON, WM., 615 Spence St., Winnipeg, Man.
HILTY, REUBEN, 619 Walnut St., Toledo, Ohio.
HINEBAUCH, T. D., Tower City, N. D.
HINKLEY, C. J., Woonsocket, S. D., Box 43.
HOAG, WALTER MORROW, 1732 Enterprise St., New Orleans, La. 1910.
HOEHN, ALVY M., Ottoville, Ohio. 1912.
HOEKZEMA, OTTO FREDERICK, McBain, Mich.
HOGARTY, JOHN J., 1724 Webster St., Oakland, Cal.
HOGG, EDWIN, 29 Butler Ave., Wilkes Barre, Pa.
HOLDEN, E. H., Box 612, Springfield, Mass.
HOLDEN, W. C., 131 No. Camel St., Delphos, Ohio. (Deceased April 16, 1916). 1914.
HOLFORD, FRED DEWITT, Box 655, Chatham, N. Y.
HOLLANDER, FERDINAND, 4616 Corondelet St., New Orleans, La.
HOLLINGSWORTH, FREDERICK H., 39 4th St., Council Bluffs, Ia.
HOLLINGSWORTH, J. B., 105 Cambridge St., Ottawa, Ont., Can.
HOLLISTER, WM. L., Avon, Ill.
HOLMES, WALTER BURDETTE, 225 E. Washington St., Springfield, Ill.
HOLT, CAMPBELL L., Box 465, Norfolk, Va.
HOOD, ARCHIBALD J., 910 Clauranald Ave., Montreal, Que., Can.
HOOPES, HERBERT, Bel Air, Md.
HOOVER, LEE C., 11 So. 9th St., Richmond, Ind.
HOPE, FREDERICK S., 148 N. Paxson St., Philadelphia, Pa.
HOPPER, JOHN B., 74 Maple Ave., Ridgewood, N. J.
HOPPER, JOHN G., Chesapeake City, Md. 1914.
HORNBAKER, JOS. N., Front Royal, Va.
HORNER, GLENN W., Westminster, Md.
HORSTMAN, EDWARD, Newton, Miss.
HOSKINS, CHESTON M., 3452 Ludlow St., Philadelphia, Pa. 1912.
HOSKINS, H. PRESTON, University Farm, St. Anthony Park, Minn.
HOUCHIN, A. S., Newark, Del.
HOUCK, U. G., Washington, D. C.
HOWARD, C. H., 271 Sheldon St., Houghton, Mich.
HOWARD, CLARENCE T., 11 N. Main St., Sullivan, Ind.
HOWARD, JULIAN, Stanwood, Wash. (Mail returned). 1910.
HOWARD, OGDEN JAY, Coloma, Mich. (Mail returned). 1912.
HOWARD, W. K., Lock Box 43, Gainesville, Tex.
HOWE, WALTER E., 444 Federal Bldg., Denver, Colo.
HOYLMAN, JOHN L., Franklin, Nebr.
HOYMAN, HARRY J., Livestock Exchange Bldg., So. St. Joseph, Mo.
HUBBELL, ARTHUR D., 318 E. 2nd St., Los Angeles, Cal.
HUDGINS, PATRICK HENRY, Box 184, Fredericksburg, Va. (Mail returned). 1911.

- HUDSON, BENTLEY F., Moweaqua, Ill.
HUDSON, PERCY WILBUR, Americus, Ga.
HUEBEN, FRANK W., 1131 Riverview Ave., Kansas City, Kans.
HUEBSCHMANN, JOHN, 625 S. 3rd St., Baltimore, Md.
HUELSEN, J., 348 W. 118th St., New York City, N. Y.
HUFF, LOGAN B., Box 227, Aurora, Ill.
HUFF, WILSON, 401 West Liberty St., Rome, N. Y.
HUFFMAN, PLEASANT J., 104-5 Livestock Exchange Bldg., Fort Worth, Texas. 1913.
HUFNALL, WILLIAM THOMAS, City Food Inspector, Port Arthur, Tex. 1913.
HUGHES, ARTHUR D., 4193 S. Halstead St., Chicago, Ill. (Deceased Feb. 15, 1916).
HUGHES, JOSEPH, 2537 State St., Chicago, Ill.
HUGINS, FRANK ALMON, P. O. Bldg., S. Omaha, Nebr.
HULL, MARTIN, 20 Federal Bldg., Kansas City, Kans.
HUMPHREY, EARL H., Santa Maria, Cal. 1914.
HUMPHREYS, J. C., Chula, Mo.
HUNT, FRANK, 214 Washington St., Jamestown, N. Y.
HUNT, J. C., 84 N. Union St., London, Ohio.
HURD, RAY B., 11th St. and 2nd Ave., South, Payette, Ida.
HURLEY, PAUL C., East St. Louis, Ill. (Mail returned). 1912.
HURST, DAN W., Box 218, Tecumseh, Nebr.
HURST, WILBUR H., Chadron, Neb.
HURT, LESLIE M., 665 N. Fair Oaks Ave., Pasadena, Cal.
HUSBAND, AUBREY G., 4th St., Belmont, Man., Can.
HUTCHISON, JOHN, 7046 Emerald Ave., Chicago, Ill.
HUTHMAN, G. H., 415 E. 7th St., Portland, Ore.
HUTTON, JOHN P., East Lansing, Mich.
HUYETT, WALTER G., East Market St., Wernersville, Pa.
HYDE, THOMAS F., Brookville, Ind.
HYLAND, EUGENE H., Schuyler, Nebr.
HYLTON, FLOYD D., Box 612, Longmont, Colo.
IDE, ALMOND H., 28 Elm St., Lowville, N. Y.
IMES, MARION, Federal Bldg., Kansas City, Kans.
INGRAM, WILLIAM L., Florence, Ala.
IRWIN, IVAN B., Stonewall, Man. 1912.
IRWIN, SAMUEL, 24 W. Jackson St., Battle Creek, Mich.
ISELL, GEORGE P., East 9th St., Hopkinsville, Ky. 1914.
IVERSON, JOHN P., Box 287, Sacramento, Cal.
JACKSON, CRAWFORD CHARLES, East Villiard St., Dickinson, N. D.
JACKSON, FRANK B., Camden, Ohio.
JACKSON, WILLIAM PETER, 429 Salem St., Chico, Cal.
JACOB, M., 312 W. Church Ave., Knoxville, Tenn.
JAFFRAY, DAVID S., JR., 209 N. Des Plaines St., Chicago, Ill.
JAGO, THOMAS E., Athens, Ga.
JAKEMAN, HARRY W., University of Nevada, Reno, Nev.
JAKEMAN, WILLIAM, Glace Bay, Nova Scotia, Can.

- JAMES, THOMAS D., 1123 Washburn St., Scranton, Pa.
JAMESON, JOHN W., 817 Pleasant St., Paris, Ky.
JARMAN, G. A., Chestertown, Md.
JEFFERIES, JOS. R., 1140 Sutter St., San Francisco, Cal.
JEFFERSON, JOSEPH H., Chicago Jet., Ohio.
JEFFREY, FRED M., 1890 N. 12th St., Toledo, Ohio.
JELEN, FRANK, Box 734, Cedar Rapids, Ia.
JENKINS, ELBERT A., 2027 Morgan St., Shelbyville, Ill.
JENKS, RALPH C., 78 Croton Ave., Ossining, N. Y.
JENNINGS, C. G., Morris, Minn.
JENSEN, H., 2468 E. 28th St., Kansas City, Mo.
JERVIS, HORACE B., 1205 Lady St., Columbia, S. C.
JERVIS, JAMES G., 3694 Victoria Drive., Vancouver, B. C.
JEWELL, CHARLES H., 4th Cavalry, Schofield Barracks, Honolulu, H. T.
JOHNSON, AARON V., 103 E. Oat St., New Albany, Ind.
JOHNSON, ALBERT C., 131 15th St., Portland, Ore. (Mail returned). 1911.
JOHNSON, AUGUST F., Memphis, Tenn. (Mail returned). 1913.
JOHNSON, JOSEPH, Union Stock Yards, Lancaster, Pa.
JOHNSON, LEVI E., 429 Pecks Ave., San Antonio, Tex.
JOHNSON, OSCAR JOSEPH, State Veterinarian, Miles City, Mont.
JOHNSTON, NERLS A., 21 Lorne St., Wetaskiwin, Alta.
JOLLY, CHARLES R., 19 Exchange Place, Atlanta, Ga. 1912.
JOLY, A., 60 Silver St., Waterville, Maine.
JONES, ALBERT C., 108 W. Washington St., High Point, N. C.
JONES, FRANK R., 742 N. Belmont Ave., Indianapolis, Ind. 1912.
JONES, FREDERIC S., 66th St. and Ave. A., New York City.
JONES, GEORGE ANDREW, Box 102, Sedro Wooley, Wash.
JONES, GEORGE B., Sidell, Ill.
JONES, JAMES M., Lewisburg, Tenn.
JONES, PHILIP K., 5604 Harvard St., Pittsburg, Pa. 1913.
JONES, W. F., 311 Second St., E., McCook, Nebr.
JOPLING, WILLIAM, North Star, Mich.
JOY, JAMES J., 2436 Collingwood Ave., Detroit, Mich.
JOSS, JESSE M., 2318 E. 24th St., Kansas City, Mo.
JOYCE, C. O., Irvington Sta., Ind.
JUCKNIESS, PAUL, 617 N. 23rd St., So. Omaha, Nebr.
JULIEN, REN C., Delphi, Ind.
JUNG, OTTO E., 1514 West 30th St., Oklahoma City, Okla.
JUNGERMAN, GEORGE T., Morrill, Kans.
KAISER, ALBERT JOHN, Kingsburg, Cal.
KALKUS, JULIUS, 805 Linden Ave., Pullman, Wash.
KAMMERER, R. A., 700 South Kingshighway, St. Louis, Mo.
KANN, R. L., Mechanicsburg, Pa.
KARTRUDE, EILERT H., Jasper, Minn.
KATSUNUMA, TOMITZO, U. S. Immigration Service, Honolulu, T. H.
KAUPP, B. F., West Raleigh, N. C.

- KAY, GUSTAVE A., B. A. I., South Omaha, Nebr.
KAYLOR, JAMES M., Barry, Ill.
KEAN, THOMAS J., 1630 W. Suydenham St., Philadelphia, Pa.
KEANE, CHARLES F., 1818 Market St., San Francisco, Cal.
KEEF, E. M., Winters, Cal.
KEEHN, WM. G., 1336 E. 15th St., Kansas City, Mo.
KEELEY, PETER T., 238 N. Elm St., Waterbury, Conn.
KEELOR, ALLEN Z., Telford, Pa. 1912.
KEELOR, J. R., Harleysville, Pa.
KEENE, HARRY L., Shabbona, Ill.
KEEPERS, ROBERT W., Greencastle, Pa.
KELLER, T. O., Ridgeville, Ind.
KELLY, JAMES SCOTT, 31 Exch. Bldg., Wichita, Kans.
KELLY, STEPHEN G. C., 1600 S. A. St., Elwood, Ind. 1911.
KELLY, THOMAS, 1204 Pine St., Philadelphia, Pa.
KELLY, WM. HENRY, 233 Western Ave., Albany, N. Y.
KELPE, HENRY O., Box 464, Albuquerque, N. M.
KELSER, RAYMOND A., B. A. I., Washington, D. C.
KELSEY, HARRY R., 1344 23rd St., Newport News, Va.
KENELEY, FRANK THOMAS, Twin Falls, Ida.
KENNEDY, E. D., Ogden, Utah.
KENNEDY, JAMES F., Bloomington, Wis.
KENNEDY, W. W., 74 E. First St., Fulton, N. Y.
KENNEY, THOS. G., Bismarck, N. D.
KERSEY, DENNIS L., 15 Bridge St., Danbury, Conn.
KERN, CHARLES B., Beloit, Kans.
KERN, HARRY F., B. Agriculture, Manila, P. I.
KETCHUM, F. D., S. St. Paul, Minn.
KETTLEHORN, A. H., Broadway, Columbus, Wis.
KEYS, ARCHIBALD A., 117 N. 10th St., Minneapolis, Minn.
KICKBUSCH, FRANK O., B. A. I., Grand Rapids, Wis.
KIERNAN, JOHN A., B. A. I., Birmingham, Ala.
KIGIN, LAWRENCE C., Lincoln, Nebr. 1914.
KIGIN, THOMAS F., 102 No. Green St., Tipton, Ind.
KILLE, WILMER B., 127 Grant St., Salem, N. J.
KING, JOHN, Carlisle, Sask., Can. 1914.
KING, SAMUEL A., 1208 Orren St., N. E., Washington, D. C.
KING, WILLIAM M., 1671 Folsom St., San Francisco, Cal.
KINGMAN, HARRY E., Fort Collins, Colo.
KINGMAN, H. W., 19 West Canton St., Boston, Mass.
KINGSTON, RICHARD H., 41 Convent Ave., New York City.
KINNEY, WILLIAM M., 133 So. Grant St., Wooster, Wayne Co., Ohio.
KINSEY, GEORGE W., 931 Market St., Wheeling, W. Va.
KINSLEY, ALBERT T., 1336 E. 15th St., Kansas City, Mo.
KINSLEY, CHRISTOPHER C., Oakley, Kans.
KINYON, B. F., Ladysmith, Wis.
KIRBY, BASSETT, 85 Cooper St., Woodbury, N. J.
KIRBY, AMOS COLLINS, Page, N. D.

- KJERNER, RUDOLPH, Chatfield, Minn.
KLEIN, LOUIS A., 39th and Woodland Ave., Philadelphia, Pa.
KLINE, A. J., Fulton St., Wauseon, Ohio.
KLIPHARDT, WM. A., 3537 A. Wyandotte St., Kansas City, Mo.
KLOTZ, JOSEPH W., Noblesville, Ind.
KNAP, ANTON E., Box 1303, Billings, Mont. (Mail returned). 1913.
KNAPP, ALBERT C., 2414 North Ave., Bridgeport, Conn.
KNAPP, G. A., Millbrook, N. Y.
KNAPP, VALENTINE M., 37 New St., Danbury, Conn.
KNIGHT, RALPH F., 109 W. Henley St., Olean, N. Y.
KNOWLES, ALBERT D., 302 S. 4th St., W., Missoula, Mont.
KNOWLES, M. E., Helena, Mont.
KNOWLES, VIRGIL W., 305 Federal Bldg., Oklahoma, Okla.
KOCH, JULIUS, East Second St., Downey, Cal.
KOCHER, FRANK T., 1010 E. Market St., Sunbury, Pa.
KOEHLER, EDWARD F., 6th and Church Sts., Easton, Pa.
KOEN, JOHN STRATTON, Adel, Ia.
KOON, GEORGE H., 12th Cavalry, Hachita, N. Mex.
KOONCE, LAFAYETTE F., 324 S. Blount St., Raleigh, N. C.
KORB, WALTER A., Dept. of Agriculture, Iloilo, P. I.
KRAGNESS, T. A., 6031 Wentworth Ave., Chicago, Ill.
KREIDER, W. E., Wadsworth, Ohio.
KREUZIGER, MARTIN W., Hotel Randolph, Bowman, N. D.
KREY, THEODORE F., 451 Sheridan Ave., Detroit, Mich.
KRIEGER, ROBERT E., Williston, N. D. 1911.
KRON, OSCAR JACOB, 1386 Goldengate Ave., San Francisco, Cal.
KUBIN, EDISON F., McPherson, Kans.
KUHN, J. M., Mercersburg, Pa.
KULP, A. I., Adel, Iowa.
LACROIX, J. VICTOR, 9 So. Clinton St., Chicago, Ill.
LADSON, THOMAS ARTHUR, Hyattsville, Md.
LAMB, CHARLES G., 1140 Corona St., Denver, Colo.
LAMB, MORGAN B., Dept of Agriculture, Columbus, O. 1911.
LAMBERT, FREDERICK WILLIAM, New Windsor, Md.
LAMBRECHTS, T., Box 71, Montevideo, Minn.
LAMES, G., Dysart, Ia.
LAMPE, W. H. G., 2939 Broadway, Indianapolis, Ind. 1912.
LAND, L. M., Limestone and Short Sts., Lexington, Ky.
LANDON, FRANK D. M., 16 Pleasant St., Great Barrington, Mass.
LANG, AUGUST R., 152 Main St., Porterville, Cal. (Mail returned). 1911.
LANGDON, HARRY B., Charlestown, W. Va.
LANGFORD, SAMUEL M., College St., Martinsburg, W. Va.
LANGTRY, WALTER, Fort Wayne, Ind. 1912.
LAPOINTE, R., St. Peter, Minn.
LAPPLE, EDWARD, 132 Exch. Bldg., care Northern Serum Co., Sioux City, Ia.
LARGENT, BERT H., Battle Ground, Ind.

- LAROCHE, OMER, 560 Visitation St., Montreal, Can. 1912.
LARSON, LOUIS N., P. O. Block, Whitehall, Wis.
LASH, CHRIS. D., care B. A. I., So. St. Joseph, Mo.
LASSEN, CHRISTIAN W., 516 Bush St., Pendleton, Ore.
LAUMAN, FREDERICK J., 2300 Cecelia Ave., Sioux City, Ia. 1912.
LAVIERS, WILLIAM NELSON, Berlin, Ohio. 1912.
LAW, JAMES, Ithaca, N. Y.
LAWTON, ANDREW NOBLE, 2 Clinton Ave., Broadhead, Wis. 1914.
LAWTON, FLETCHER E., 110 Madison St., Greencastle, Ind.
LAYNE, ERNEST, Huntington, W. Va.
LEACH, EDWARD DANIEL, 333 Clinton St., Ft. Wayne, Ind.
LECLAIRE, THOS. EDW., Alberta, Can. P. O. Box 501, Calgary, Alta
LEE, DANIEL D., 549 Albany St., Boston, Mass.
LEE, WALTER HERBERT, Brundidge, Ala.
LEECH, G. EDW., 322 Main St., Winona, Minn.
LEGENHAUSEN, ADOLPH H., Weldon, Ill. 1913.
LEGNER, ARTHUR J., Leland, Ill.
LEIGH, BEVERLY M., 411 20th Ave., Meridian, Miss. 1913.
LEININGER, DANIEL B., 7th Cavalry, Douglas, Ariz.
LEITH, FRED J., 1401 Michigan Ave., Chicago, Ill.
LEITH, THOMAS LESTER, Alliance, Nebr.
LEMLEY, GEO. GRANT, 2106 Cumming St., Omaha, Nebr.
LEN, ROBERT C., Mascoutah, Ill. 1912.
LENFESTY, JOHN H., Lyons, Ohio.
LENTZ, FRANK E., 39th and Woodland Ave., Philadelphia, Pa. 1911
LENTZ, WM. J., 39th and Woodland Ave., Philadelphia, Pa.
LEONARD, MILTON M., 18 South Park Square, Asheville, N. C.
LEPPLA, L. J., 769 West Monroe St., Chicago, Ill. 1910.
LESLIE, CHAS. ADELPHUS, 10 Masonic Temple, Deadwood, S. D.
LETT, HASKELL, 111 W. 3rd St., Seymour, Ind.
LETTENEY, JAMES T., 42 Charles St., Rochester, N. H.
LEUTHOLT, HENRY, 250 Main St., Taylor, Pa.
LEWIS, HAROLD M., 20 Railroad Sq., Nashua, N. H.
LEWIS, HENRY S., 110 Washington Ave., Chelsea, Mass.
LEWIS, JAMES, Greenwood, Miss.
LEWIS, SEYMOUR V., Glenwood City, Wis.
LEWIS, WALTER KEYS, 901 Union Natl. Bank Bldg., Columbia, S. C.
LEWIS, WATSON F., Waseca, Minn.
LICHENWALTER, H. W. C., 1215 15th St., Sacramento, Cal.
LICHTY, WM. W., Woodstock, Ill.
LINBERG, JOHN WILLIAM, 228 W. 53rd St., Philadelphia, Pa.
LINCH, CHARLES, 123 North Allen St., Albany, N. Y.
LINCOLN WILLIS B., Neuhooff Abattoir & Packing Co., Nashville,
Tenn.
LINDBURG, O. ENOCH, 423 N. 10th St., Lincoln, Nebr. 1913.
LINDLEY, PAUL S., Paoli, Ind. 1912.
LIPP, CARL FREDERICK, 208 Occidental Life Bldg., Albuquerque,
N. M.

- LIPP, CHARLES C., Brookings, S. D.
LIPP, GEORGE A., Box 818, Roswell, N. M.
LOBDELL, STEPHEN C., 6 S. 3rd St., LaFayette, Ind.
LOCKE, GEORGE H., Lockford, Cal.
LOCKETT, STEPHEN, Univ. of Nev., Reno, Nev.
LOCKHART, ANDREW A., Carnduff, Sask.
LOGAN, EDWARD A., 3209 Mitchell Ave., St. Joseph, Mo.
LOGAN, JAMES AUSTIN, Oakes, N. D.
LOLLAR, ERNEST E., Red Cloud, Nebr.
LOMBARD, CHARLES M., 4502 Emerald Ave., Chicago, Ill.
LONGLEY, OTIS A., 24th and Broadway, Oakland, Cal. Western
Laboratories.
LOTHE, HERBERT, Waukesha, Wisconsin.
LOUCK, REX CLARK, Clarence, Ia.
LOVE, GROVER V., Main St., Chalmers, Ind.
LOVE, JAMES R. (address unknown). 1910.
LOVEBERRY, CLARENCE, Quartermaster Dept. U. S. Army, SanFran-
cisco, Cal. 1910.
LOVEJOY, J. O., Federal Bldg., Augusta, Ga.
LOVELAND, GROVE W., 49 East Main St., Torrington, Conn.
LOVELL, ROY, 200 W. 5th St., York, Nebr.
LOWE, J. PAYNE, 171 Jefferson St., Passaic, N. J.
LOWE, W. S., 17 North 1st St., Phoenix, Ariz. 1912.
LOWREY, FREDERICK H. S., 1127 Keele St., Toronto, Ont., Can.
LUEDER, CHARLES AUGUSTUS, 752 North Front St., Morgantown,
W. Va.
LUKES, HARRY, 441 Sumner Ave., Springfield, Mass.
LULL, ELMER L., Parma, Ida.
LUTHER, W. H., Boonville, Ind.
LUZADOR, ROY A., Morrisonville, Ill.
LYMAN, RICHARD P., P. O. Box 1018, East Lansing, Mich.
LYON, H. C., Hutchinson, Minn.
LYTLE, W. HARRISON, Salem, Ore.
MCALLISTER, RANCIE G., 1259 Fillmore St., Corvallis, Ore.
MCADORY, ISAAC S., Auburn, Ala.
MCALPINE, D., Box 696, Brockville, Ont., Can.
MCANULTY, JOHN F., 2832 North 6th St., Philadelphia, Pa. 1912.
MCCAFFREY, JAMES, Lock Box 83, Red Bank, N. J.
MCCAIN, EARL A., Gregory, S. D. 1912.
MCCARTHY, CHAS. F., 1317 Fulton St., San Francisco, Cal. 1912.
MCCARTHY, F. H., 317 N. 3rd St., Pottsville, Pa.
MCCARTHY, HENRY J., Arlington, Md.
MCCARTHY, THOS. A., Livestock Exch. Bldg., Chicago, Ill. (Mail
returned). 1914.
MCCARTNEY, JOHN, Middletown, N. Y.
MCCASKILL, ALEXANDER WHITNEY, Weyburn, Sask., Can.
MCCAUGHEY, N. W., Church St., Veterinary Hospital, Presque Isle,
Me.

- McCLAIN, L. GORDON, Manzanola, Colo. 1910.
McCLELLAN, MILTON PORTER, 222 Hongus Crescent, Regina Sask.
McCLELLAND, ALFRED H., Walton, N. Y.
McCLELLAND, FRANK E., 455 Ellicott St., Buffalo, N. Y.
McCLOSKEY, ANTHONY J., Chestnut Hill, Pa.
McCORD, FRANK A., 215 Queens Ave., Edmonton, Alta.
McCOWEN, D., Edgeley, N. D.
McCOY, ELLIS E., Canton, Miss.
McCOY, FRANKLIN C., 1623 South I St., Bedford, Ind.
McCOY, JOHN E., Box 21, Cawker City, Kans.
McCRANK, J. A., 79 Saily Ave., Plattsburg, N. Y.
McCUAIG, D., McAdam Junction, New Brunswick, Can.
McCULLEY, ROBERT W., 38 Lexington Ave., New York City, N. Y.
McCULLOUGH, EDW. ALEX., 219 McDowell St., Delavan, Wis.
McCURDY, FRANK C., 616 No. 10th St., St. Joseph, Mo.
McCUSHING, FRANCIS P., 104 High St., Keene, N. H.
McDANIEL, J. C., 1319 S. A. St., Elwood, Ind.
McDANIEL, JOHN SAMUEL, East Lansing, Mich.
McDONALD, D. M., 3932 Pleasant Ave., Minneapolis, Minn.
McDONNELL, L. E., Audubon, Minn.
McDONOUGH, JAMES, 47 Portland Place, Montclair, N. J.
McDONOUGH, JOHN F., 1633 So. 22nd St., Philadelphia, Pa.
McDOWELL, CLARENCE, 614 2nd St., Watertown, S. D. 1911.
McDOWELL, HARRIS B., Middletown, Del. 1912.
McELYEA, LEWIS WESLEY, Ames, Ia.
McEVERS, ALBERT E., 349 Michigan Ave., Chicago, Ill. (Mail returned). 1911.
McFARLAND, C. M., 230 Exch. Bldg., Sioux City, Ia.
McFATRIDGE, HOWARD SIMONA, 30 Argyle St., Halifax, N. S., Can.
McGILVRAY, CHAS. D., Dept. of Agriculture, Winnipeg, Man., Can.
McGILLIVRAY, GEORGE, Box 303, Roseau, Minn.
McGROARTY, BERNARD, Boothwyn, Pa. 1913.
McGUIRE, W. C., Pitt and Second Sts., Cornwall, Ont., Can.
McINNES, BENJAMIN KATER, 57 Queen St., Charleston, S. C.
McKAY, ALEXANDER M., 527 4th Ave., Calgary, Alta.
McKENNA, JOHN F., 616 Eye St., Fresno, Cal.
McKENZIE, K. J., Northfield, Minn.
McKEON, WM. JOS., 716 Cambie St., Vancouver, B. C. 1910.
McKERCHER, ARTHUR, 115 Ionia St., E., Lansing, Mich.
McKEY, JOHN, 1926 W. 1st St., Duluth, Minn.
McKIBBIN, DAVID JR., 2900 Frankfort Ave., Philadelphia, Pa.
McKILLIP, CHESTER A., 1639 Wabash Ave., Chicago, Ill.
McKILLIP, GEORGE B., 1639 Wabash Ave., Chicago, Ill.
McKILLIP, MATTHEW H., 1639 Wabash Ave., Chicago, Ill.
McKILLIP, WALTER J., 1639 Wabash Ave., Chicago, Ill.
McKIM, CHARLES A., 2737 P. St., Lincoln, Nebr.
McKIM, ORVILLE ERNEST, 338 West 56th St., New York City.
McKINNEY, WM. J., 585 Driggs St., Brooklyn, N. Y.

- McKINNON, JOHN ALEX., Land Transportation, Manila, P. I.
McLAIN, JOHN H., Inkster, N. D.
McLEAN, ADAM T., Truro, Nova Scotia, Can.
McLEAY, JOHN DONALDSON, Indianapolis, Ind.
McLEOD, J. H., Charles City, Ia.
McMULLEN, ROBERT H., 444 Federal Bldg., Denver, Colo.
McNAIR, FREDERICK H., 2126 Haste St., Berkeley, Cal.
McNALLY, MICHAEL, 1412 Pine St., St. Louis, Mo. 1914.
McNAUGHTON, D. D., 717 Kelly Ave., Devil's Lake, N. D.
McNEIL, JAMES C., 3349 Webster Ave., Pittsburg, Pa. 1910.
McNEIL, JOHN H., Sao Paulo, Brazil, S. America. (Mail returned).
1914.
McPIKE, CLARENCE T., Cando, N. D.
MACCORMACK, C. DOUGLAS, North Baltimore, Ohio.
MACDONALD, R. W., 522 Brush St., Flint, Mich. (Mail returned).
1911.
MACINTOSH, ROBERT DUNCAN, 296 Danforth Ave., Toronto, Can.
(Mail returned). 1914.
MACK, C. A., Gilbert Plains, Man., Can.
MACK, JAMES F., River Falls, Wis.
MACK, WINFRED B., Univ. of Nevada, Reno, Nev.
MACKELLAR, ROBERT S., 351 West 11th St., New York, N. Y.
MACKELLAR, WM. M., 219 Federal Bldg., San Diego, Cal.
MACKIE, CLEMENT L., Towson, Md. (Mail returned). 1913.
MACKIE, FRANK H., 1035 Cathedral St., Baltimore, Md.
MADSON, WM., Appleton, Wis.
MAHAFFY, THOMAS J., Box 920, Jacksonville, Fla.
MAHON, JAMES, 405½ Main St., Irwin, Pa.
MAIR, ALEXANDER M., 124 S. Park St., Streator, Ill.
MAJOR, JOHN PERRY, City Bldg., Anderson, S. C.
MAKINS, E., Jr., Abilene, Kans. Box 445.
MALCOLM, PETER, New Hampton, Ia.
MALONEY, THOS. E., 1095 N. Main St., Fall River, Mass.
MALONE, WILLIAM J., Mt. Horeb, Wis.
MANGAN, DANIEL J., 2557 Third Ave., Bronx, New York City.
MANSFIELD, CHARLES M., 1344 Newton St., N. W., Washington, D.C.
MANUEL, EDWARD A., 232 Park Pl., Des Plaines, Ill.
MARKS, DANIEL G., 562 West 12th St., Chicago, Ill. 1912.
MARQUARDT, S. J., Barnesville, Ohio.
MARQUETTE, WILLIAM M., 240 Hudson St., Indianapolis, Ind. 1912.
MARQUIS, FRANCIS, M., French Camp, Cal.
MARSH, HADLEIGH, 3401 16th St., N. W., Washington, D. C.
MARSHALL, CHARLES WILLIAM, Main St., Brewster, N. Y.
MARSHALL, CLARENCE J., 39th and Woodland Ave., Philadelphia, Pa.
MARSHALL, HENRY, 202 Federal Bldg., Richmond, Va.
MARSHALL, HERBERT, Mechum River, Va.
MARSHALL, L. G., Towanda, Pa. 1911.
MARSTELLER, ROSS P., College Station, Texas.

- MARTIN, HARRY D., 481 Rhode Island St., Buffalo, N. Y.
MARTIN, ROBERT D., 1192 Broad St., Bridgeport, Conn.
MARTIN, STANLEY THOMAS, 281 James St., Winnipeg, Man., Can.
MARTIN, W. E., 281 James St., Winnipeg, Man., Can.
MARVEL, ALEX. L., Owensville, Ind.
MASON, A. L., Oahu, T. H.
MASON, WILLIAM DENT, Box 488, Elko, Nev.
MATHEWS, E., 187 Grand St., Jersey City, N. J.
MATROCCE, DANIEL, J. St., Los Banos, Cal.
MATTSON, WM. H., Chester Heights, Pa. 1912.
MAULDIN, COLUMBUS E., Jeanerette, La.
MAULFAIR, CHAUNCEY D., R. D. No. 2, Granville, Ill. 1910.
MAWER, GEORGE C., 9219 Clifton Blvd., Cleveland, Ohio.
MAXSON, WILBUR BERNETT, Flemington, N. J.
MAYNARD, LEE H. P., 1937 Market St., Philadelphia, Pa.
MAYO, N. S., 4753 Ravenswood Ave., Chicago, Ill.
MAZE, LUTHER A., care Parke, Davis & Co., Rochester, Mich.
MEAD, R. N., Crawfordsville, Ind.
MEADE, ALBERT M., National Stock Yards, Ill. (Mail returned).
1912.
MEADORS, W. H., National Stock Yards, E. St. Louis, Ill.
MEALS, FREDERICK F., 123 E. Randolph St., Enid, Okla.
MEAGHER, JOHN A., Box 172, Glendale, Ohio. 1912.
MEBANE, WM. LONG, Rockwood, Maine
MEGOWAN, CLAUDE L., 1021 J. St., Sacramento, Cal.
MEINERS, R. F., Boonton, N. J. 1914.
MEISNER, H. A., 1133 Hartford Ave., Baltimore, Md.
MEIXEL, GEORGE A., Aurora, Nebr. 1911.
MERILLAT, LOUIS A., 1827 Wabash Ave., Chicago, Ill.
METCALFE, A. R., Van Kleek Hill, Ont., Can.
MEYER, GEORGE W., 528 Washington St., New York City.
MEYER, KARL F., Second and Parnassus Ave., San Francisco, Cal.
MEYERHOEFFER, JOS. STEWART, Weyers Cave, Va. 1911.
MEYST, FREDERICK W., 144 Bryant St., N. W., Washington, D. C.
MICHAEL, LEO B., East Main St., Collinsville, Ill.
MICHAEL, WM. ROBERT, Highland, Ill.
MICHNER, HIRAM M., North Wales, Pa. 1914.
MIDDLETON, ASA C., Grundy Center, Ia.
MILKS, HOWARD J., N. Y. State Veterinary College, Ithaca, N. Y.
MILLARD, HUGH R., 2507 Central Ave., Cheyenne, Wyo.
MILLEN, CHARLES J., care Jacob E. Decker & Sons, Mason City, Ia.
MILLER, A. DALE, 29 Vine St., Dayton, Ohio. 1913.
MILLER, A. W., 4534 S. 18th St., Omaha, Nebr.
MILLER, C. A., 411 South Jackson St., Louisville, Ky.
MILLER, CHESTER, Elliott & Co., Duluth, Minn.
MILLER, DANIEL S., 230 Mill St., East Port Chester, Conn.
MILLER, FREDERICK A., Fitchburg, Mass.
MILLER, HARRY K., 128 W. 53rd St., New York City.

- MILLER, JOHN FRED, 24 New Scotland Ave., Albany, N. Y.
MILLER, JOHN M., 152 Louis St., Grand Rapids, Mich.
MILLER, JOHN P., 46 Reed St., Reading, Pa. 1913.
MILLER, SAMUEL H., 2125 3rd Ave., Rock Island, Ill. 1910.
MILLER, THOMAS C., 600 Tribune Bldg., Winnipeg, Man., Can.
MILLS, C. C., 355 E. Main St., Decatur, Ill.
MILLS, H. LEE, 118 Pearl St., Burlington, Vt. 1913.
MINER, GEORGE H., 180 Claremont Ave., Buffalo, N. Y.
MISSALL, FRANK CHARLES, Cor. Mill and Pine Sts., Santa Maria, Cal.
MITCHELL, ADRIAN J., SR., 1219 Peach St., Erie, Pa. 1914.
MITCHELL, AQUILA, 3rd Field Artillery, Fort Sam Houston, Tex.
MITCHELL, GEORGE C., Klamath Falls, Ore.
MITCHELL, HARRY BARTLE, R. F. D. 2., Wellsboro, Pa.
MITCHELL, JAMES FRANCIS, Anaconda, Mont. Hotel Montana.
MITCHELL, J. R., 610 S. 3rd St., Evansville, Ind. 1912.
MITTERLING, IRA, 302 Montgomery St., Hollidaysburg, Pa.
MIX, C. C., 110 W. Jackson St., Battle Creek, Mich.
MOCK, WM., 53 N. Fourth St., Easton, Pa.
MOEGLING, RICHARD EMIL, 3017 Jefferson Ave., Cincinnati, Ohio.
1913.
MOHLER, JOHN R., Dept of Agriculture, Washington, D. C.
MOLGARD, PETER C., Ruskin Nebr.
MOLT, FRED S., Big Spring, Tex.
MOOBERRY, OLIVE WAKON, Morton, Ill. 1912.
MOODY, ARTHUR H., 402 Armitage St., Three Rivers, Mich.
MOODY, ROBERT P., 111 Sutton St., Maysville, Ky.
MOORE, A. E., 175 Waverly St., Ottawa, Can.
MOORE, CHARLES S., 5 Oak St., Danvers, Mass.
MOORE, HAMLET, 610 N. Rampart St., New Orleans, La.
MOORE, HUBERT O., Box 299, Hattiesburg, Miss.
MOORE, ROBERT C., St. Joseph Veterinary College, St. Joseph, Mo.
MOORE, SHEARD, 608 Iberville St., Donaldsonville, La.
MOORE, VERANUS A., New York State Vet. College, Ithaca, N. Y.
MOORHOUSE, WM. B., 37 Main St., Tarrytown, N. Y. 1913.
MOREHOUSE, WALTER G., 746 Mill St., Salem, Ore.
MOREL, JULES F., State Board of Health, Portland, Ore. (Mail returned). 1912.
MOREY, B. FRANKLIN, 235 S. Main St., Clinton, Ind.
MORGAN, FRANK W., 6th and Cherry Sts., Chattanooga, Tenn.
MORGAN, WM. JEROME, Seaton, Ill.
MORIN, C. L., 9 Messenger St., St. Albans, Vt.
MORRIS, EDWARD H., 221 Main St., Derby, Conn.
MORRIS, HARRY, Experiment Station, Baton Rouge, La. 1913.
MORROW, ALBERT CAINE, Dillon, Mont.
MORSE, JOHN H., Box 377, Sumter, S. C.
MOSS, HARRY T., 710 W. Third St., Dayton, Ohio.
MOUNT, WILLET C., 1155 Walnut St., Red Bluff, Cal.
MOYER, B. FRANKLIN, 3929 Baltimore Ave., Philadelphia, Pa.
(Mail returned). 1912.

- MOYER, CALVIN W., Quakertown, Pa.
MOYER, FRANK LEONARD, Carey, Ohio.
MOYER, VINCENT C., South Hampton, Pa. (Mail returned). 1914.
MUELLER, FERDINAND A., 459 E. Washington St., Indianapolis, Ind.
MULLER, J. HERMAN, Long Green, Md.
MULVEY, CHARLES J., Mooers, New York.
MUNCE, THOMAS W., R. D. No. 2, Washington, D. C. (Mail returned).
MUNCE, T. EDWARD, State Livestock Sanitary Board, Harrisburg, Pa.
MUNGER, GRANT B., 2226 N. Illinois St., Indianapolis, Ind.
MUNN, ALBERT A., Kearney, Nebr.
MUNN, AHIZAH, J., Fayette, Mo.
MURCH, ALFRED LITTLEFIELD, 17 Boynton St., Bangor, Me. 1913.
MURISON, JAMES J., Manor St., Arcola, Sask., Can.
MURPHEY, HOWARD SYLVESTER, 519 Welch Ave., Ames, Iowa.
MURPHY, BERNARD W., 604 N. 11th St., St., Joseph, Mo.
MURPHY, DANIEL E., Prairie due Sac, Wis.
MURPHY, FRANCIS P., 1813 N. 2nd St., Philadelphia, Pa. 1914.
MURPHY, JOSEPH WHITMORE, Columbia, S. C.
MUSSELMAN, S. F., Frankfort, Ky.
MYDLAND, GUSTAV HERMAN, Everest Kans.
MYERS, HARRY E., 140 S. Main St., Fostoria, Ohio.
MYERS, M. J., Ft. Payne, Ala.
MYERS, SIDNEY D., 215 Walnut St., Wilmington, Ohio.
MYERS, W. F., Fort Wayne, Ind. (Deceased).
NANCE, JOSEPH E., Anadarko, Okla.
NASH, ELMER DENNETT, 717 Sixth Ave., Helena, Mont.
NATTRESS, JOSEPH T., Delevan, Ill.
NAYLOR, RALPH EDELEN, Cheyenne, Wyo., Box 397.
NEILSON, NORMAN, 345 Market St., Colusa, Cal.
NEBEKER, SHIRLEY, Lake Town, Utah. 1912.
NEFF, S. C., Staunton, Va. 1912.
NELSON, AMOS F., 656 E. 21st St., Indianapolis, Ind.
NELSON, CHARLES A., 224 Front St., Brainard, Minn.
NELSON, CONRAD L., Box 691, S. St. Joseph, Mo. 1913.
NELSON, NELSON L., Ames, Ia.
NELSON, S. B., Pullman, Wash.
NEUHAUS, CHARLES O., Union Stock Yards, Pittsburgh, Pa.
NEWBURG, LOUIS, 2442 Forest Ave., Kansas City, Mo.
NEWCOMB, HARRIE H., National Stock Yards, Ill.
NEWCOMER, E. W., Mt. Joy, Pa.
NEWGENT OTTAWAY C., 1448 Sycamore St., Terre Haute, Ind.
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NEWMAN, LLOYD V., 800 Lincoln Ave., York, Nebr.
NEWSOM, I. ERNEST, Colorado Agricultural College, Ft. Collins, Colo.
NEWTON, J. V., Erie and Walnut Sts., Toledo, Ohio.

- NEY, WILLIAM O., Michigan City, Miss.
NICE, FRANK K., 3514 N. 15th St., Philadelphia, Pa.
NICHOLAS, GEORGE B., 1404 Holmes St., Kansas City, Mo. 1914.
NICHOLS, PERCIVAL K., 107 Harrison Ave., Port Richmond, N. Y.
NIGHBERT, E. M., 211 Federal Bldg., Atlanta, Ga.
NIGHBERT, JAMES D., Pittsfield, Ill.
NILES, W. B., Box 927, Ames, Ia. 1912.
NIMPHIUS, HARRY F., 761 E. 163rd St., New York City.
NISSLEY, SOLOMON M., 18 Spring St., Bellefonte, Pa.
NIVEN, ANDREW B., Inspector in charge Hog Serum Station, Henderson, Ky.
NIXON, ROBERT B., Demopolis, Ala.
NOACK, OTTO G., 54 S. 6th St., Reading, Pa.
NOBACK, CHARLES V., Otisville, N. Y.
NOBLE, GEO. EDW., 1312 Grove St., Boise, Idaho.
NOONAN, ALBERT J., Bernard, Ia. 1913.
NORDEN, CARL J., 1518 Pasco St., Kansas City, Mo.
NØRGAARD, VICTOR A., Honolulu, Hawaii, Territorial Veterinarian.
NORRIS, CLARENCE L., 4 L. S. Record Bldg., U. S. Stockyards, Chicago, Ill.
NORTHROP, LEONARD E., 105 N. Davidson St., Indianapolis, Ind.
NORTON, J. C., Cor. Washington and 1st Ave., Phoenix, Ariz.
NORTON, OSCAR M., 109 Main St., Greenville, Miss.
NORTON, ROBERT S., Velve, N. D.
NOYES, ORRIN W., Valentine, Nebr.
NULPH, PEARLEY E., Crosby, N. D.
NUNN, HENRY, Box 337, McMinnville, Ore.
O'BANION, ARCHIE L., Box 439, Santa Barbara, Cal.
O'BRIEN, PAT. JOS., 732 S. Figueroa St., Los Angeles, Cal. 1912.
O'BRYAN, SHERID, Pesotum, Ill.
O'CONNOR, JOSEPH, West Hope, N. D.
O'DONNELL, MICHAEL J., 241 Grove St., Blue Island, Ill.
O'HARRA, WILLIAM G., Galloway, Ohio.
ODELL, EDWIN O., Central City, Nebr.
OESTERHAUS, JOHN H., 465 Livestock Exchange, Kansas City, Mo.
OLIVER, WALTER GORDON, 840 2nd St., San Diego, Cal.
OLSEN, LUTHER E., care U. S. B. A. I., So. St. Paul, Minn.
OLTHOUSE, MARTIN, Grass Lake, Mich.
O'NEAL, WM., Newman, Cal.
O'REILLY, JAMES M., 508 E. 3rd St., Merrill, Wis.
O'ROURKE, MICHAEL JOHN, 720 Valencia St., San Francisco, Cal.
ORME, FRANK W., 720 Valencia St., San Francisco, Cal. 1910.
ORME, THOS. WHITFIELD, 260 5th St., San Bernardino, Cal. 1910.
ORR, WILLIAM CROSBY, Dillon, Mont.
ORTIZ, CARLOS, 26 Villa St., Ponce, Porto Rico. 1913.
OSBORN, ORIN H., Paynesville, Minn.
O'TOOLE, STEPHEN, Agricultural College, Fargo, N. D.
OUTHIER, C. B., Salinas, Cal.

- PACE, JOHN C., Box 597, Calexico, Cal.
PAIGE, JAMES B., Amherst, Mass.
PAINE, HAROLD, Rosetown, Saskatchewan.
PALMER, CLINTON BUDD, 204 Ferry St., Easton, Pa.
PALMER, DONALD B., Live Stock Sanitary Board, St. Paul, Minn.
PALMER, FLOYD ELBERT, Owatonna, Minn.
PALMER, H. F., R. D. No. 2, Parma, Mich.
PAQUIN, CHARLES HENRY, 17 Fiske St., Worcester, Mass.
PAQUIN, LEON A., Box 225, Webster, Mass.
PARKER, JOHN CLARKE, 28 Pearl St., St. Albans, Vt.
PARKER, LEON L., 439 Main St., Catskill, N. Y.
PARKINSON, GEORGE H., Box 799, Middletown, Conn.
PARRISH, ROSCOE DAMRON, 1724 Davenport St., Omaha, Nebr.
(Mail returned).
PARRISH, WILLIAM WALLER, 2808 Central Ave., Tampa, Fla.
PARSE, FRANKLIN L., Columbia, Miss.
PATRIC, LEWIS A., 132 Cedar St., Snohomish, Wash.
PATRICK, MURRAY E., Penn Ave., Greenburg, Pa.
PATTERSON, ELIJAH E., 650 Grand River Ave., Detroit, Mich.
PATTERSON, E. I., Mound City, Mo.
PATTERSON, HENRY G., 915 Gravier St., New Orleans, La. 1913.
PATTISON, HOMER D., Box 40, Beloit, Wis.
PAUL, ARTHUR, Box 291, Portersville, Cal.
PAULSEN, THOMAS C., 506 Government St., Baton Rouge, La. 1910.
PAXSON, WM. H., Marietta, Pa.
PAXTON, IRVING B., Box 562, Red Bluff, Cal.
PEARCE, CHARLES D., 10 Carhart Ave., Binghamton, N. Y.
PEARCE, DEE, Box 222, Celeste, Tex.
PEARCE, FRANK H., Carson, Ia. (Mail returned).
PEARSON, CHARLES, Amarillo, Tex.
PECK, EDWIN J., 3895 W. 34th St., Cleveland, Ohio.
PECK, SANFORD ARTISAN, Oak Grove, Mo.
PEDERSON, GUNERIUS M., Hamler, Ohio.
PEIRCE, HARRIE W., 83 Playstead Road., West Medford, Mass.
PEIRCE, LAWRENCE L., 10 Central St., Arlington, Mass.
PENNIMAN, G. P., Cor. Exchange and Commercial Sts., Worcester, Mass.
PERKINS, CHESTER R., 19 Hillside Ave., Buffalo, N. Y.
PERRIGO, W. H., 580 1st Ave., Milwaukee, Wis. 1912.
PERRY, CHAS. H., 82 Park Ave., Worcester, Mass.
PERRY, F. M., Edgell St., Framingham, Mass.
PERRY, JAMES G., Box 294, Ennis, Tex.
PETERS, A. T., Box 43, Peoria, Ill.
PETERSEN, THEODORE J., Ukiah, Cal. 1914.
PETHICK, W. E., 16 Lyman St., Waltham, Mass.
PETHICK, W. H., Charlottetown, P. E. Isle, Can.
PETTY, CLARENCE C., Lake Odessa, Mich.
PFARR, ALBERT WM., 4623 Friendship St., Pittsburg, Pa.

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PHELPS, CHAS. D., Fifth St., Clear Lake, Ia.
PHELPS, OLIVER JAY, Mill St., Lexington, Ky., Y. M. C. A. Bldg.
PHILIPS, CHAS. S., Mt. Vernon, Wash.
PHILLIPS, J. M., 3732 West Pine Blvd., St. Louis, Mo.
PHILLIPS, S. C., Sheridan, Ind. (Mail returned). 1914.
PHILPOTT, LUTHER B., 248 West 4th St., Provo, Utah. 1911.
PHILP, FRED W., Box 204, Mineral Point, Wis.
PHYFE, WALTER H., 9 Grove St., Middletown, N. Y.
PIATT, D. A., 1706 2nd Ave., Birmingham, Ala.
PICKENS, EARL MAX, 106 Cook St., Ithaca, N. Y.
PIELEMEIER, HENRY, R. D. No. 1, Solsberry, Ind.
PIERCE, FOSTER H., Faulkton, S. D. 1914.
PIERRET, WILBUR, B. A. I., So. St. Joseph, Mo.
PIKE, FREDERICK, 817 1st Ave., Spokane, Wash. 1910.
PINE, HENRY E., Carrizozo, N. M. 1914.
PINKROSS, ROLF D., Camp Dennison, Ohio. 1913.
PIRIE, LESLIE D., 172 Garfield St., Santa Cruz, Cal.
PISTOR, ADOLPH H., B. A. I., Washington, D. C.
PLANTZ, JOHN FRANK, 50 E. Buchtel Ave., Akron, Ohio.
PLATT, ROBERT M., Coldwater, Kans.
PLAYDON, C. H., Reading, Mass.
PLUMMER, ALEX., 1140 Sutter St., San Francisco, Cal.
POE, C. E., 113 E. Franklyn St., Hagerstown, Md.
POLLARD, JOHN SAMUEL, 183 Harrison St., Providence, R. I.
POMFRET, HENRY, 158 Athole St., Winnipeg, Man., Can. 1914.
POOLEY, JOHN R., 820 S. 14th St., E., Cedar Rapids, Ia.
POPE, GEORGE W., 1340 Meridian Place, N. W., Washington, D. C.
POPE, LEMUEL, JR., Orleans, Mass. 1912.
PORTER, E. C., 120 N. Mercer St., New Castle, Pa.
PORTER, FRED W., 104 N. Ross Ave., Tampa, Fla.
POTE, THOMAS B., 4925 Park View Place., St. Louis, Mo.
POTTER, GEO. M., B. A. I., Washington, D. C.
POTTER, JASPER S., 226 S. Capitol St., Iowa City, Ia.
POUCHER, M. M., 132 West 3rd St., Oswego, N. Y.
POWELL, E. W., Box 61, Bryn Mawr, Pa.
POWER, CLINTON W., 218 Perry St., Attica, Ind.
POWERS, MAURICE RAY, Norwalk, Conn.
PRESLER, H. A., Fairbury, Ill.
PRESTON, MARVIN JAMES, Moosomin, Sask. (Mail returned). 1914.
PRICE, CHAS. E., 310 East 5th St., Santa Ana, Cal. 1911.
PRICE, JOHN O. F., Morris & Co., Memphis, Tenn.
PRIEN, OTTO LOUIS, Box 626, Laramie, Wyo. (Mail returned). 1912.
PRIEN, ROLAND H., R. F. D. No. 31, Morgan Hill, Cal. 1912.
PRIEST, BENJ. H., 501 Flower St., Kern Branch, Cal.
PRIOR, ROBERT, 214 S. 2nd St., North Yakima, Wash. 1912.
PRITCHARD, JOHN W., Fessenden, N. D.

- PRITCHARD, WM. T., North Platte, Nebr.
PRITCHETT, LAMAR F., Auburn, Ala.
PROUSE, HARVEY LEE, Allen, Nebr.
PROUSE, WM. C., 615 4th Ave., Minneapolis, Minn.
PRUCHA, JOSEPH V., care Dr. Howe, Denver, Colo.
PUGH, WALTER MAURICE, Powers Lake, N. D.
PUGH, WM. T., 57 Elm St., South Bridge, Mass.
PULLAM, JOHN H., Santa Ana, Cal.
PULVER, WM. A., Wamego, Kans.
PURCELL, JNO. T., Federal Bldg., Rapid City, S. D.
PURDY, MARION ALEXANDER, 621 10th St., Shelbyville, Ky.
QUIGLEY, ROSCOE MURPHY, Cor. Logan Ave. and Herold St., Ty-
rone, Pa. 1914.
QUIN, ABNER H., Creston, Ia.
QUINN, JAMES E., Antioch, Cal.
QUINN, P. E., 632 W. Washington St., Indianapolis, Ind.
QUINN, THOS. F., 709½ 9th St., Greeley, Colo. 1910.
QUITMAN, E. L., 1514 West VanBuren St., Chicago, Ill.
RADCLIFF, BURDETT D., 108 Franklin Square, New Britain, Conn...
RADER, EDWARD B., Clinton, Wis. 1910.
RAPTER, EDWARD, Hamburg, N. Y.
RAGAN, JAMES A., 510 Liberty St., Morris, Ill.
RAGLAND, MARCUS J., Salisbury, N. C.
RAMSEY, R. A., B. A. I., Washington, D. C.
RAMSEY, SAMUEL A., JR., 234 Third St., Terre Haute, Ind. 1913.
RAMSEY, SAMUEL V., 234 South Third St., Terre Haute, Ind.
RAMSAY, WM., J. C., Box 481, Watsonville, Cal.
RANCK, EDWARD M., Agricultural College, Miss.
RANSOM, SHERMAN, 1923 3rd St., Vancouver, B. C. (Mail re-
turned). 1913.
RAQUE, CHAS. A., 219 Federal Bldg., Spokane, Wash.
READ, H. W., 27 Court St., Freehold, N. J.
READHEAD, WM., Lenox, Ia.
REGAN, W. J., 606 River St., Patterson, N. J.
REARDON, JOHN D., Bureau of Agriculture, Manila, P. I. 1913.
REBER, ABRAHAM N., 2104 N. Tremont St., Kansas City, Kans.
REBOLD, GEORGE P., 4553 Wabash Ave., Chicago, Ill. (Mail re-
turned). 1911.
RECORDS, EDWARD J., Univ. of Nevada, Reno, Nev.
REDHEAD, WM. H., Dept. of Health, Cleveland, Ohio. 1914.
REED, RAYMOND C., Newark, Del.
REEFER, LEON N., 1405 Chapline St., Wheeling, W. Va.
REICHEL, JOHN, care H. K. Mulford Co., Glenolden, Pa.
REICHMANN, ANDREW FRANCIS, Armour, S. D.
REICHMANN, FERDINAND A., Geddes, S. D.
REID, WILLIAM, Yorkton, Sask.
REIFSNYDER, IRVIN S., Collegeville, Pa.
REIHART, OLIVER F., 835 N. 22nd St., S. Omaha, Nebr.

- RENO, JOHN S., Southport, Ind.
RENTER, ELMER J., 767 Delhi Ave., Cincinnati, Ohio.
RENTER, WALTER W., 2632 W. Sixth St., Cincinnati, Ohio.
RENTSCHLER, MANDON D., 232 N. Front St., Punxsutawney, Pa.
REVERCOMB, GEO. ARCHIE, Lewisburg, W. Va.
REY, CHARLES R., Tulare, Cal.
REY, GEORGE S., S. Court St., Visalia, Cal.
REYNOLDS, FRANCOIS H. K., B. A. I. Quarantine Div., Washington, D. C.
REYNOLDS, HOWARD C., Factoryville, Pa.
REYNOLDS, M. H., Experimental Farm, St. Paul, Minn.
RHEA, R. LEE, Houston & Bowie Sts., San Antonio, Tex. 1913.
RHODES, WARREN L., Lansdowne, Pa. 1913.
RHODES, C. J., Beloit, Wis.
RICE, JOHN M., Cambridge St., S., Lindsay, Ont., Can.
RICE, RAY D., Maple Rapids, Mich.
RICEBARGER, BENJAMIN F., 200 W. Main St., St. Charles, Ill.
RICH, FRANK A., Agricultural Experiment Station, Burlington, Vt.
RICH, THEODORE S., 1477 West Grand Blvd., Detroit, Mich.
RICHARDS, THOS. H., 1127 Keele St., Toronto, Ont., Can.
RICHARDS, WM. R., care W. N. Neil, So. Omaha, Nebr. 1914.
RICHARDS, WILLIAM WILSON, Manila, P. I.
RIDDELL, ROBERT, 460 Chester St., Victoria, B. C.
RIDGE, WILLIAM H., Maple Ave., Somerton, Philadelphia, Pa.
RIEDEL, PHILIP H., 1401 Roache St., Indianapolis, Ind.
RIETZ, J. H., 633 Crawford Ave., Ames, Ia.
RIKE, HARRY W., 735 Linden Ave., Burlingame, Cal. (Deceased).
RILEY, EDWARD H., Experiment Station, Bozeman, Mont.
RIORDON, J. J., Beverly Farms, Mass. 1914.
RIORDON, WM. F., Gilroy, Cal.
RISHEL, ALBERT E., care U. S. Consulate, Liverpool, Eng.
RISLEY, HARRY B., 74 Adams St., Brooklyn, N. Y.
RITTER, PHILIP, 1609 East 37th St., Kansas City, Mo.
RITTER, ROY W., Holtville, Cal.
RIVERS, REUBEN N., Lansdale, Pa. 1913.
ROACH, FRANK, Box 489, Pendleton, Oregon.
ROADHOUSE, CHESTER L., College of Agriculture, Berkeley, Cal.
ROBERTS, GUY A., Agricultural Experiment Station, W. Raleigh, N. C.
ROBERTS, GEORGE H., 2242 Park Ave., Indianapolis, Ind.
ROBERTS, J. H., 64 King St., Northampton, Mass.
ROBERTS, JAMES WILLIAM, Davis Creek, Cal.
ROBERTSON, JAMES E., Monona, Ia.
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ROBERTSON, JAMES L., 409 9th St., New York City. (Deceased).
ROBINSON, BEALE A., 310 N. 8th St., Independence, Kans.
ROBINSON, EDWIN A., 214 Bollingsbrook St., Petersburg, Va.
ROBINSON, JOHN W., Garrison, N. D.

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ROBINSON, PAUL L., 535 Public Ave., Beloit, Wis. 1913.
ROBINSON, THOMAS E., 65 Main St., Westerly, R. I.
ROBINSON, WM. B., 72 Maysville St., Mt. Sterling, Ky.
ROBINSON, W. H., 87 Leland St., Portland, Maine.
ROCKWELL, ARCHIE MERRITT, Eleanor, Ill.
RODGERS, J. C., 715 Jackson St., Anderson, Ind.
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ROGERS, BURTON R., St. Joseph Veterinary College, St. Joseph, Mo.
ROGERS, HOWARD P., 68 Cochituate St., Saxonville, Mass.
ROHRER, C. G., 128 W. 53rd St., New York City.
ROIG, CHESTER A., 173 Carroll St., Poughkeepsie, N. Y.
ROME, JOHN, Germantown, Md.
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ROSENBERGER, GUY W., San Diego, Cal.
ROSENBERGER, MAYNARD, 219 Federal Bldg., San Diego, Cal.
ROSENTIEL, CHAS. H., 125 Wyandotte St., Freeport, Ill.
ROSHON, HARRY BROWN, 1131 Greenwich St., Reading, Pa.
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ROSS, H. H., 4 Resson Bldg., Brandon, Man., Can.
ROSS, JAMES D., 796 William Ave., Winnipeg, Man., Can.
ROSE, THOMAS P., Gresham, Nebr.
ROSWELL, WM. L., 122 4th Ave., Corry, Pa.
ROUB, J. F., Monroe, Wis.
ROUECHE, R. C., 1382 W. 73rd St., Cleveland, Ohio.
ROYER, B., Franklyn St., Shawano, Wis.
RUMBAUGH, GEORGE H., Millersburg, Ohio.
RUNDLE, THOMAS THEODORE, 435 First St., Oxnard, Cal.
RUNGE, WERNER, 130 Union St., Newark, N. J.
RUNYON, PETER F., 24 E. Main St., Freehold, N. J.
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RUSSELL, FAY FRANKLIN, 214 Washington St., Jamestown, N. Y.
RUSTAD, ALVIN O., 303 Bismarck St., E., Fergus Falls, Minn.
RUTH, THOMAS H., DeSmet, S. D.
RUTHERFORD, J. G., Canadian Pacific Railway Co., Calgary, Alta.
RYAN, EDWARD T., 83 Washington St., Brookline, Mass.
RYAN, FRANK C., Middletown, Md.
RYAN, J. F., 2525 Indiana Ave., Chicago, Ill. 1913.
RYDER, HERMAN R., 5719 W. Superior St., Chicago, Ill.
RYDER, J. E., Forest Hills Inn, Forest Hills Garden, L. I., N. Y.
SADLER, ERNEST D., Wagner, S. D.
SALLADE, J. W., Auburn, Pa.
SALSBERY, C. E., 4220 Chestnut St., Kansas City, Mo.
SANDERS, ALFRED E., 1033 Shelby St., Indianapolis, Ind. 1914.
SANDERSON, WILLIAM, Sidney, Ohio.
SANFORD, E. F., 115 Sterling Place, Brooklyn, N. Y.

- SAUNDERS, CHAS., 215 E. Central Ave., Eldorado, Kans. 1911.
SAVAGE, ARTHUR J., 414 E. Pikes Peak Ave., Colo. Springs, Colo.
SAVAGE, WILLARD A., Box 527, Tucumcari, N. M.
SAWYER, F. N., Bakersfield, Cal.
SAYRE, B. HARRY, Brookings, S. D.
SCHADER, CURTIS H., Sunnyside, Wash.
SCHAEFER, EDW. H., 3215 Anderson Ave., Kansas City, Mo. 1914.
SCHAEFER, G. L., Tekamah, Nebr.
SCHAEFER, VALENTIN, Tekamah, Nebr.
SCHAFFTER, E. P., 408 P. O. Bldg., Detroit, Mich.
SCHALK, ARTHUR F., Agricultural College, N. D.
SCHAUFLE, CHAS. A., 1338 Hunting Park, Philadelphia, Pa. 1912.
SCHERMERHORN, ROBERT J., 106 E. Citrus Ave., Redlands, Cal.
SCHLEICH, FRED HARRISON, Williamsport, Ohio.
SCHLOEMER, CHAS. C., 602 River Terrace, Hoboken, N. J.
SCHMIDT, HUBERT, College Station, Tex.
SCHNEIDER, ERNEST, Kulm, N. D.
SCHNEIDER, F. H., York Road and Erie Ave., Philadelphia, Pa.
SCHNEIDER, FREDERICK L., Box 464, Albuquerque, N. H.
SCHNEIDER, FRANCIS O., Nicholasville, Ky. Box 504.
SCHOENING, HARRY W., B. A. I., Washington, D. C.
SCHOENLEBER, F. S., 805 Houston St., Manhattan, Kans.
SCHRECK, OSCAR, 94 William St., New Haven, Conn.
SCHROEDER, E. C., B. A. I., Experiment Station, Bethesda, Md.
SCHUCENGOST, ROBERT HUNTER, Swea City, Ia.
SCHUH, HERMAN L., 152 Louis St., Grand Rapids, Mich.
SCHULTZ, CHAS. H., Box 84, Seattle, Wash.
SCHUMACHER, WILHELM, 1450 Park Ave., Durango, Colo.
SCHWARZE, HERMAN R., 500 S. Douglas Ave., Springfield, Ill.
SCHWARTZ, JOHN A., Lawrence, Ind. 1912.
SCHWARZKOPF, OLAF, Fort Sam Houston, Tex.
SCHWEIN, PAYSON E., Elkhart, Ind.
SCOTT, CARL J., Knoxville, Ia.
SCOTT, GEO. A., Waterloo, Iowa.
SCOTT, JOHN, 236 Eaton St., Peoria, Ill. . .
SCOTT, JOHN A., Waverly, Minn. 1913.
SCOTT, M. W., 24 S. 6th St., Vincennes, Ind.
SCOTT, WM. A., 1407 1st Ave., Columbus, Ga.
SEELEY, JAMES T., No. 1101 Westlake Ave. N., Seattle, Wash.
SEIBERT, WALTER D., 808 Howard St., Petoskey, Mich. 1913.
SELBY, ORVAL C., Worthington, Minn.
SELF, PRESLEY M., Farmersburg, Ind.
SENSEMAN, BENJ. F., 1723 N. 55th St., Philadelphia, Pa.
SEVERCOOL, LUCIUS A., 217 Lake Ave., Elyria, Ohio.
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SEVEROVIC, MIRKO F., 1833 Blue Island Ave., Chicago, Ill.
SEVENSTER, JOHN, Washington St., Hamburg, Ia.
SEXSMITH, A. B., Charlotte, Mich.

- SEXTON, MICHAEL J., 819 Marquette Ave., Minneapolis, Minn.
SHAFFER, DALLAS W., 4035 Olive St., St. Louis, Mo. 1910.
SHAND, JAMES REID, U. S. Army, Tientsin, China.
SHARP, WALTER E., Newton, Ia.
SHARTLE, WALTER W., 413 N. New Jersey St., Indianapolis, Ind.
SHAW, CHARLES W., 200 W. 78th St., New York City.
SHAW, CLARENCE E., 115 Sterling Place., Brooklyn, N. Y.
SHAW, WILLIAM HARVEY, Pawnee, Ill.
SHEALEY, ALONZO S., Bureau of Agriculture, Manila, P. I.
SHEARBURN, THOS. O., Walnut, Ill.
SHELDON, THOS., Rhinebeck, N. Y. 1911
SHELTON, J. E., Box 308, Arkansas City, Kans.
SHEPARD, E. H., 2027 E. 105th St., Cleveland, Ohio.
SHEPPARD, WM., Neck Road, Sheepshead Bay, Long Island, N. Y.
SHERIDAN, GEORGE, Ashland, Nebr.
SHERWOOD, ARTHUR M., Naperville, Ill.
SHEVALIER, EUGENE D., Escanaba, Mich.
SHIGLEY, RALPH E., Kenmare, N. D.
SHIKLES, ERNEST ADAIR, Dearborn, Mo.
SHILLINGER, JACOB E., Easton, Md.
SHIPLEY, LEVI U., Sheldon, Ia.
SHIPLEY, TRAJAN, Live Stock Exchange, Sioux City, Ia.
SHIPMAN, OLIVER B., Hilo, T. H.
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SHORE, CHALMER S., Lake City, Minn.
SHORE, HOWARD J., Dept. of Agriculture, Washington, D. C.
SHREVE, RAYMOND M., Vine and Church Sts., Panora, Ia.
SHULER, C. C., Eaton, Ind.
SHUMWAY, DANIEL G., B-4 Carlton Court, Buffalo, N. Y.
SHUTTE, VERNON D., Volcano House, Kau, T. H.
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SIGMOND, CHAS. J., Box 80, Pipestone, Minn.
SILFVER, OSCAR, Norwood, La.
SILVERWOOD, HERBERT, 331 Clackmas St., Portland, Ore.
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SIMMS, BENNETT THOMAS, Oregon Agricultural College, Corvallis, Ore.
SIMMONS, WILLIAM HERBERT, 2344 W. Chestnut St., Louisville, Ky.
SIMPSON, C. ROWLAND, 123 N. Broadway, Los Angeles, Cal.
SIMPSON, HAL C., Box 69, Denison, Iowa.
SIMPSON, WM. H., 45 Dartmouth St., Malden, Mass.
SIMS, FRANK C., Aurora, Nebr.
SIMS, THOS., Woodburn, Ore.
SISSON, SEPTIMUS, Ohio State University, Columbus, Ohio.
SKERRITT, HENRY W., 315 Columbia St., Utica, N. Y.
SKINNER, JOHN FREDERICK, Box 167, Morris, Man., Can.
SLATER, J. HARVEY, 3012 Holmes St., Kansas City, Mo.
SLATER, LEROY E., 1115 Prospect St., Indianapolis, Ind.

SLAWSON, ALEXANDER, 248½ St. Nicholas Ave., New York City. 1912.

SLOULIN, G. E., Aneta, N. D. 1912.

SMEAD, MORGAN J., Parkedale Farm, Rochester, Mich.

SMELLIE, JAMES, Eureka, Ill.

SMITH, A. W., Farmer City, Ill.

SMITH, BERT C., Bridgen, Ont., Can.

SMITH, CLARENCE E., Dept. of Public Health, Greenville, S. C.

SMITH, FLETCHER EUGENE, 4801 Evanston Ave., Seattle, Wash.

SMITH, GEORGE F., Vicksburg, Miss. 1914.

SMITH, GEO. W., 157 6th St., Hoboken, N. J.

SMITH, HERBERT M., 407 Federal Bldg., Providence, R. I.

SMITH, HENRY V., 90 Wildmere Ave., Detroit, Mich.

SMITH, JESSE P. F., 2310 Central Ave., Kansas City, Kans.

SMITH, ROBERT P., Wendell, Ida.

SMITH, R. V., 17 Court St., Frederick, Md.

SMITH, STANLEY N., 112 College Ave., Columbia, Mo.

SMITH, S. P., Cando, N. D.

SMITH, T. E., 309 Barrow St., Jersey City, N. J.

SMITH, WM. B., Interlaken, N. Y. 1911.

SMITH, WRIGHT J., 260 Clinton Ave., Kingston, N. Y.

SMYTHE, FRANK R., 1523 Groesbeck Rd., Cincinnati, Ohio.

SNYDER, RUDOLPH, 444 Federal Bldg., Denver, Colo.

SOCKMAN, CLIFFORD CLYDE, Deshler, Ohio.

SOLLBERGER, R. J., 1412 S. 8th St., St. Louis, Mo.

SONGER, LEE C., Dept. of Agriculture, Olathe, Kans.

SOLO, C. H., Arlington, Ohio.

SORENSEN, ANDREAS I., R. F. D. No. 6, Stockton, Cal.

SORRELL, WARREN, Willard, N. M.

SPADE, FRED A., Constantine, Mich.

SPALDING, N. C., 760 W. Center St., Somerset, Colo.

SPEAR, WM. H., 122 Cumberland Ave., Portland, Me.

SPENCER, H. F., 1415 J. St., Sacramento, Cal. 1910.

SPENCER, H. H., 429 W. Adams St., Jacksonville, Fla.

SPENCER, TRACY N., 7 W. Depot St., Concord, N. C.

SPRAGUE, JOHN D., Seward, Nebr.

SPRINGER, C. W., 48 Morgantown St., Uniontown, Pa.

SPRINGER, SAMUEL E., B. A. I., S. Omaha, Neb.

SPRINGER, U. S., 27-29 Hastings St., bet. Canal and Ottawa, Grand Rapids, Mich.

STAAB, JOHN J., 1422 W. 65th St., Cleveland, Ohio.

STALEY, RAYMOND M., Camp Hill, Pa.

STAMP, ASHLEY G., 198 Candler Ave., Highland Park, Mich.

STANCLIFT, RAY J., 15th Cavalry, Fort Riley, Kans.

STANFORD, JOHN F., Fayetteville, Ark. 1911.

STANGE, C. H., Iowa State College, Ames, Ia.

STAPLES, WM. D., 1813 Quintard Ave., Anniston, Ala.

STATES, HARRY E., 93 Bagley Ave., Detroit, Mich. 1912.

- STEDDON, R. P., 1468 Harvard St., Washington, D. C.
STEEL, EDWARD R., Chester, Nebr.
STEELE, HARRY F., Ft. McIntosh, Laredo, Tex.
STEELE, JOSEPH G., 217 Exchange Bldg., Ft. Worth, Tex.
STEHLE, FREDERICK, JR., 5145 Pine St., Philadelphia, Pa.
STEINBACH, FREDERICK G., Oak and Pacific Ave., Wildwood, N. J.
STEPHENS, RUSSELL A., B. A. I., Cincinnati, Ohio. 1910.
STEPHENS, GEORGE, 18 Maplewood Terrace, White River Jct., Vt.
STETSON, HENRY G., 24 Cliff St., St. Johnsbury, Vt.
STEVENS, CECIL H., Box 106, Stevensville, Mont.
STEVENS, GUY G., 20 Park St., Groton, N. Y.
STEVENS, HERBERT L., 192 Limerock St., Rockland, Me.
STEVENSON, GEORGE T., Burlington, Vt. 1913.
STEVENSON, JAMES A., Gretna, Man.
STEWART, C. E., Chariton, Ia.
STEWART, H. L., Chariton, Ia.
STEWART, SAMUEL L., 3335 Brooklyn Ave., Kansas City, Mo.
STEWART, WALTER C., West Union, Ia.
STEWART, WALTER J., 4352 Montgomery St., Oakland, Cal.
STICKEL, WILLIAM E., Etna Mills, Cal.
STINER, JARVIN O., Lindsay, Cal.
STINSON, WILLIAM, Chelsea, Mass. 1910.
STIVER, M. B., Elgin, Man. 1911.
STOKES, WILFRED J., Ft., Riley, Kans.
STONE, GARRY T., Sidney, N. Y.
STOUDER, KIRK W., Ames, Ia.
STOUFFER, DAVID F., Bellevue, Nebr.
STOVER, JOHN PRICE, Shady Grove, Pa.
STRAYER, JOSEPH EDW., Hartington, Neb.
STREETS, JNO. JAMES, Box 87, Ventura, Cal.
STRIBLING, WM. E., New England, N. D.
STRICKLER, C. M., 25 Elm Lane, Greencastle, Pa.
STRINGER, N. I., Lock Box 195, Stewartville, Minn. 1912.
STRODTMAN, OTIS E., 211 E. 5th Ave., Arkansas City, Kans. 1912.
STROUP, WM. L., Corinth, Miss.
STRUTHERS, CHAS. E., Union Stock Yards, Chicago, Ill. (Mail returned). 1912.
STUBBS, EVAN LEE, State Farm, R. D. 3., Media, Pa.
STUBBS, GEORGE W., Opelousas, La. 1910.
SUGG, REDDING S., 243 Market St., Washington, N. C.
SULLIVAN, JAMES, 807 N. Eldorado St., Stockton, Cal. 1911.
SULLIVAN, WALTER A., Box 666, Twin Falls, Ida.
SUMMERFIELD, JAS. J., Main and First Sts., Santa Rosa, Cal.
SUNDERVILLE, EARL, Forest Home, Ithaca, N. Y.
SUTTER, ERROLD, Beach, N. D. 1913.
SUTTON, OTIS L., 1701 Kinney Ave., Cincinnati, Ohio.
SWENERTON, L. DANIEL, 500 8th Ave., E., Vancouver, B. C. 1913.
SWENSON, SIGWART R., Maddock, N. D.

- SWITZER, WILLIAM B., 50 East 7th St., Oswego, N. Y.
SYLVESTER, JOHN FLETCHER, Langdon, N. D.
TADE, JAMES M., 518 N. 1st St., Vincennes, Ind.
TALBERT, JOSEPH F., 721 W. 8th St., Kansas City, Kans.
TALBOT, PERCY R., Box 703, Edmonton, Alta.
TAMBLYN, DAVID S., Box 616, Regina Sask., Can. 1914
TANSEY, EDWARD J., Monrovia, Ind.
TAYLOR, CHAS. H., 632 Sycamore Rd., DeKalb, Ill.
TAYLOR, GEO. C., Redding, Cal.
TAYLOR, LAWRENCE L., Condon, Ore.
TAYLOR, WALTER J., Dos Palos, Cal.
TEIE, JOHN A., Hatton, N. D.
TENCHNICK, DERK, 1639 Wabash Ave., Chicago, Ill. 1912.
TENNENT, J. H., 275 King St., London, Ont., Can.
THACKER, THOMAS, Renfrew, Ont., Can. 1913.
THOMPSON, CHAS. GOFF, 204 E. Main St., Little Falls, N. Y. 1910.
THOMPSON, JOHN A., Bureau of Agriculture, Manila, P. I.
THOMPSON, JOHN B., Harvey, N. D.
THOMPSON, JOHN S., 903 East 5th St., Moscow, Ida.
THOMPSON, JOSHUA P., 16 Grand Ave., N. Billings Mont. 1911.
THOMPSON, MULFORD C., Box 145, Sharon, Conn.
THOMPSON, WARWICK M., 1210 Main St., Red Bluff, Cal.
THOMPSON, WILLIAM, Box 145, Laredo, Tex.
THOMAS, RAYMOND F., Canton, Miss. 1914.
THORNTON, EDWARD L., Fort Kent, Me.
TIEFENTHALER, FRANK, Cambridge City, Ind. 1912.
TILLMAN, ALBERT C., Earlville, Ill.
TIMMONS, WILFRED H., Box 254, Madison, Ind.
TIPTON, WILLIAM B., Emporia, Kans.
TODD, ROBERT S., New Milford, Conn.
TOLMIE, S. F., Box 1518, Victoria, B. C.
TOMLINSON, W. J., Williamsport, Pa. 1914.
TOMPKINS, LELAND J., Walton, N. Y.
TOOLEY, JAS. WM., 38 4th St., Fond du Lac, Wis.
TORGERSON, HENRY E., Gilroy, Cal.
TOPMILLER, ALEXANDER C., P. O. Box 224, Murfreesboro, Tenn.
TORRANCE, F., Veterinary Director-General, Ottawa, Ont., Can
TOTTEN, G. E., 410 Fulton Bldg., Pittsburg, Pa.
TOW, EDWARD, 1415 J. St., Sacramento, Cal. 1914.
TOWNE, GEORGE V., Box 54, Thompson, Conn.
TOWNER, ALBERT N., Towners, N. Y.
TOWNSEND, GEORGE, New Glasgow, N. S., Can.
TOWNSEND, NORRIS L., 104 W. 42nd St., New York City.
TRACY, ANGUS W., Sherbrook, Que., Can.
TRAINOR, PETER F., 42 Mercer St., Jersey City, N. J. 1913.
TRAUM, JACOB, Univ. of California, Berkeley, Cal.
TREADWAY, CHARLES R., 2438 Prospect Ave., Kansas City, Mo.
TRICKETT, ARTHUR, 1336 E. 15th St., Kansas City, Mo.

- TRIGG, WILLIAM STARK, Aiken, S. C.
TRIPPEER, H. A., 219 Newell St., Walla Walla, Wash.
TRUAX, BLAIR W., Burr Oak, Kans.
TURLINGTON, JOHN A., Melfa, Va.
TURNER, H. A., Rose Ave., Pleasanton, Cal.
TURNER, HENRY W., New Hope, Pa.
TURNER, JOHN E., 204 S. Detroit St., Kenton, Ohio.
TURNER, J. P., 916 O. St., N. W., Washington, D. C.
TUTTLE, CHAS. D., Canton, S. D. 1910.
TUTTLE, LYFORD E., Grafton, N. H.
TUXILL, A. J., 5 Lincoln St., Auburn, N. Y.
TYLER, JOHN LOU, 125 S. Main St., Pomona, Cal.
TYNER, ALPHEUS L., R. R. 4, Kempton, Ind.
UDALL, D. H., N. Y. State Vet. College, Ithaca, N. Y.
UNDERHILL, B. M., 3 West 3rd St., Media, Pa.
UTT, JAMES GARFIELD, 721 G. St., Sacramento, Cal.
VAIL, IRVING ROE, 20 George St., New Haven, Conn.
VAIL, WALLACE F., 267 Greenwich Ave., Greenwich, Conn. 1910.
VANS DE ERE, JACOB, Sherwood, N. D.
VANS AGNEW, ROBERT, Ft. Leavenworth, Kans.
VAN EENENAM, JOHN, Salem, S. D. 1910.
VAN ES, L., M. D., Agricultural College, Fargo, N. D.
VEIT, WM., 240 N. 52nd St., Philadelphia, Pa.
VELDHUIS, ZACHARY, 408 P. O. Bldg., Detroit, Mich.
VENZKE, HARRY E., Garretson, S. D. (Mail returned). 1912.
VERMILYA, RALPH F., Minnehaha Apartment No. 25, St. Paul, Minn. 1913.
VIGNEAU, JOSEPH H., Union Market Hotel, Watertown, Mass.
VLEIT, GEO. B., 202 Baldwin St., Hackettstown, N. J.
VOLLMEER, CARL G., Bryans, Ohio.
VOORHEES, E. R., 87 E. Main St., Somerville, N. J.
VULLIAMY, H. F., Plaqueimine, La. 1914.
WADDLE, GEORGE, Kalamazoo, Mich. 1912.
WAGAMAN, GROVER M., 210 W. Superior St., Kokomo, Ind.
WAGNER, CHARLES W., Elkton, Ky.
WAGONER, C. OTTO, 121 S. 10th St., Richmond, Ind.
WALCH, CLEMENCE C., B. A. I., Exchange Bldg., S. St. Joseph, Mo.
WALCH, CHAS. IRA, 4823 King Hill Ave., St. Joseph, Mo.
WALKER, R. G., 238 Aberdeen St., Chicago, Ill. 1914.
WALKLEY, SEYMOUR J., 185 Northwestern Ave., Milwaukee, Wis.
WALMSLEY, F. D., 924 Rutger St., Utica, N. Y.
WALTERS, PERCY KNIGHT, Suite 11, Argyle Court, Calgary, Alta.
WALSH, ERNEST J., Minot, N. D.
WALSH, L. S. N., 4225 Delmar Blvd., St. Louis, Mo.
WALTERS, PERCY KNIGHT, Suite 11, Argyle Court, Calgary, Alta.
WARD, ARCHIBALD R., B. A. I., Washington, D. C.
WARD, GEORGE R., 424 Persia Ave., San Francisco, Cal.
WARD, HARRY C., Fulton, Mo.

- WARD, JOHN E., 12 E. Crescent St., Grand Rapids, Mich.
WARD, S. H., State Capitol, St. Paul, Minn.
WARD, VICTOR, Paso Robles, California.
WARNER, CHAS. G., 701 S. 4th St., Padukah, Ky. 1913.
WARNOCK, DAVID, House of Commons, Ottawa, Ont., Can.
WASHBURN, HENRY J., 704 B. St., S. W., Washington, D. C.
WASHBURN, W. B., 172 E. Market St., Tiffin, Ohio.
WATERS, R. E., 28 Village Rd., Gravesend, Long Island, N. Y. 1913.
WATSON, EDWARD A., Box 567, Lethbridge, Alta.
WATSON, THOS. W., Kerens, Tex.
WAUGH, JAMES A., 1100 Fifth Ave., Pittsburgh, Pa.
WAY, CASSIUS, 108 Hudson St., New York City.
WEBB, A. J., 2347 Hudson Ave., Ogden, Utah.
WEBB, JAMES CLEVELAND, Piedmont, Ala.
WEBB, WILLIAM T., Quarryville, Pa.
WEBB, W. W., Auburn, Ala.
WEBBER, CARR R., 135 Crossman Terrace, Rochester, N. Y.
WEBBER, ORRIN B., 69 Front St., Rochester, N. Y.
WEBER, HENRY STANLEY, 6128 Park Ave., Weehawken, N. J.
WEBER, JOHN H., Boise, Ida.
WEBSTER, JOHN H., Y. M. C. A., Reno, Nev.
WEBSTER, WILLIAM OWENS, Utica, Ohio.
WEEKS, CORNELIUS C., 309 3rd St., N. W., Washington, D. C.
WEHLE, FRANK A., 586 Sayre Ave., Lexington, Ky.
WEIGEL, MARION S., Cromwell, Ind.
WEGNER, EARL EDWARD, Pullman, Wash.
WEINMAN, JOSEPH E., Arcadia, Neb.
WEIR, ROBERT, 84 Grove St., Rutland, Vt.
WEITZEL, FRED, 100 Parkway West., Pittsburg, Pa.
WELCH, GUY NOBLE, 39 Union St., Northfield, Vt.
WELCH, JOHN, Rolland, Man. 1911.
WELCH, WM. B., 353 W. Arrow St., Marshall, Mo.
WELLS, THOMAS GROVER, Arthur, Ill. 1914.
WENDE, BERNARD P., 101 Florence Ave., Buffalo, N. Y.
WENDE, HORATIO S., Tonawanda, N. Y. 1914.
WERNTZ, HARVEY GRANT, E. Liberty, P. O. Box 321, Pittsburg, Pa.
WERSHOW, MAX, Veterinary Clinic Bldg., Columbus, Ohio.
WERTZ, SIDNEY S., Kenesaw, Nebr.
WESTCOTT, GEORGE F., 1008 Congress St., Portland, Me.
WESTCOTT, HENRY B., 1008 Congress St., Portland, Me.
WEST, JAY P., 121 Monona Ave., Madison, Wis.
WESTERHEIDE, EDWARD FRANCIS, Minster, Ohio. 1912.
WESTGATE, SAMUEL S., Box 1763, Grafton, N. D.
WHEELER, A. S., Biltmore, N. C.
WHITCOMB, MORTON S., Livestock Sanitary Board, St. Paul, Minn.
WHITE, D. S., 1656 Neil Ave., Columbus, Ohio.
WHITE, ERNEST A., 1233 Dryade St., New Orleans, La.

- WHITE, GEORGE R., 1314 Adams St., Nashville, Tenn.
WHITE, JOHN L., 5327 Union Ave., Chicago, Ill.
WHITE, LOGAN A., Sioux Rapids, Ia.
WHITE, STEPHEN A. K., 114 St. Andrew St., Victoria, B. C.
WHITE, V. C., Blackfoot, Ida.
WHITE, WILLIAM T., 4 Edinboro Place., Newtonville, Mass.
WHITEHOUSE, ARTHUR W., Ft. Collins, Colo.
WHITEMAN, HARRY JOHNSON, 1301 Ligonier St., Latrobe, Pa.
WHITESSELL, ROY B., 2 So. 4th St., Lafayette, Ind.
WHITESTINE, ORVILLE G., 47 E. Washington St., Huntington, Ind.
WHITNEY, A. HOMER, Narka, Kans.
WHITNEY, HARRISON, 20 George St., New Haven, Conn.
WHITNEY, J. C., 3 West St., North, Hillsdale, Mich.
WHITNEY, JOHN GREGORY, 26 Summer St., Montpelier, Vt.
WHITTLESEY, R. TSALL, 714 E. 7th St., Los Angeles, Cal. 1911.
WHYTE, JOHN D., 315 Sixth Ave., E., Calgary, Alta.
WIGHT, W. E., 237 McKee Place, Pittsburg, Pa.
WICKS, A. G., 23 N. College St., Schenectady, N. Y.
WILEY, MORRIS C., Trinidad, Colo., B. A. I.
WILKINS, JOHN E., Johnson and Jordan Sts., Greenville, Tex.
WILL, EVAN J., Harrisonburg, Va.
WILLETT, FREDERICK C., Henry, Ill.
WILLIAMS, GEO. M., 611 College St., Boone, Ia.
WILLIMAN, EARL LEROY, Ohio City, Va.
WILLIS, HARRY S., Orange, Va.
WILLS, J. G., 27 Matilda St., Albany, N. Y.
WILLYOUNG, LESTER E., 11th Cavalry, Ft. Oglethorpe, Ga.
WILSON, CLAUD, 113 So. State St., Greenfield, Ind.
WILSON, FRED O., 314 Madison St., Greenbay, Wis.
WILSON, JOHN OSCAR, Box 714, Miles City, Mont.
WILSON, ROBERT H., care Parke, Davis & Co., Rochester, Mich.
WILTRANT, FRANK ADAM, 16 Washington St., Wilkes Barre, Pa.
WING, CHARLES C., McCloud, Cal. 1914.
WINSLOE, J. A. H., Cooperstown, N. D.
WINSLOW, C., Rockland, Mass.
WINSLOW, JOSEPH H., Lamoure, N. D.
WINSTANLEY, JOHN H., 119 S. 37th St., Philadelphia, Pa.
WINTER, HOWARD E., 132 E. Second St., Plainfield, N. J.
WINTERINGHAM, HARRY BARKER, 118 Western Ave., Petaluma, Cal.
WIPF, J. D. C., Belgrade, Mont.
WISE, WILLIAM F., 246 W. Liberty St., Medina, Ohio.
WISNER, SCOTT, Omega, Neb.
WITMER, HERVEY W., Bradentown, Fla.
WITTE, CHARLES R., New Britain, Conn. 1913.
WOLCOTT, LEROY B., Shelton, Nebr.
WOLCOTT, WALTER A., 713 East Johnson St., Madison, Wis.
WOLF, ORTHO C., West 7th St., Ottawa, Kans.
WOOD, A. L., Hampton, Ia.

- WOOD, EZRA P., 415 Market St., Charlottesville, Va.
WOOD, FREDERICK WM., Cutter Laboratory, Berkeley, Cal.
WOOD, PAUL EWING, Ottawa, Ohio. 1912.
WOODEN, MORRIS, Wardman Court, Washington, D. C. 1912.
WOODLIFFE, MARK J., 637 E. 20th St., Denver, Colo.
WOODSIDE, JAMES H., Auburn, Wash.
WOODWARD, B. T., Pennsylvania Ave and 28th St., S. E., Washington, D. C.
WOOLFOLK, GEO. H., Pottsville, Pa.
WORCESTER, HARRY, 118 W. 3rd St., Middletown, Ohio.
WORMS, ALBERT C., 2932 Broadway, Chicago, Ill.
WRAY, A. M., Denver, Colo.
WRIGHT, C. C., Health Bureau, Portland, Ore.
WRIGHT, LESLIE A., Water St., Columbus, Wis.
WRIGHT, NORMAN, 137 20th St., West Saskatoon, Sask.
WRIGHT, W. DEAN, 1227 Missouri Ave., Portland, Oregon.
WURM, JOHN E., Pigeon, Mich.
YANCEY, WILLIAM E., 864 S. Virginia St., Reno, Nev.
YARD, WILLIAM W., Hotel Ayers, Denver, Colo. 1913.
YOUNG, GEORGE D., 9945 S. Irving Ave., Chicago, Ill.
YOUNG, G. R., 4602 Center St., Omaha, Neb.
YOUNG, HULBERT, 515 N. Charles St., Baltimore, Md.
YOUNG, JOHN M., 419 6th St., Brooklyn, N. Y.
YOUNG, WILLIAM A., Prospect, N. Y.
YOUNGBERG, STANTON, Bureau of Agriculture, Manila, P. I.
YUNKER, ELKAN H., 2344 N. 18th St., Philadelphia, Pa.
ZELLER, JOHN LEWIS, Orosi, Tulare Co., Cal.
ZELL, CHARLES AUGUST, 4362 Kenmore Ave., Edgewater Station, Chicago, Ill.
ZICKENDRATH, ERNEST G., 101 Middlefield, Road, Palo Alto, Cal.

THE NUMBER OF VETERINARIANS IN ACTIVE PRACTICE IN EACH
STATE AND THE MEMBERSHIP OF THE AMERICAN
VETERINARY MEDICAL ASSOCIATION COMPARED
WITH THE VALUE OF THE LIVESTOCK

(Compiled by the Secretary of the American Veterinary Medical
Association, June, 1916).

STATE	No. of Practicing Veterinarians*	No. of A.V.M.A. Members	Percentage of A.V.M.A. Members	Total Value Livestock†	Value of Livestock per Veterinarian
Alabama	150	22	14.6	\$65,595,000	\$ 437,300
Ariz. and N. Mexico	49	18	36.7	69,546,000	1,419,306
Arkansas	213	3	1.4	74,058,000	347,690
California	371	140	37.7	127,600,000	343,935
Colorado	80	32	40.0	70,161,000	877,012
Connecticut	109	33	30.2	14,164,000	129,944
Delaware	16	4	25.0	6,817,000	426,062
Dist. of Columbia	25	44	176.0	153,000	6,120
Florida	47	5	10.6	20,591,000	438,106
Georgia	69	10	14.4	80,394,000	1,165,130
Idaho	71	15	21.1	49,775,000	701,056
Illinois	919	126	13.7	308,805,000	336,022
Indiana	725	107	14.7	173,860,000	239,806
Iowa	650	78	12.0	393,003,000	604,620
Kansas	570	53	9.4	253,524,000	444,778
Kentucky	264	21	7.9	117,487,000	445,026
Louisiana	59	22	37.2	44,699,000	757,610
Maryland	118	30	25.4	32,570,000	276,016
Massachusetts	450	55	12.2	20,741,000	46,091
Michigan	445	68	15.2	137,804,000	309,671
Minnesota	306	55	17.9	161,641,000	528,238
Mississippi	132	21	15.1	75,247,000	570,053
Missouri	351	71	20.2	285,839,000	814,356
Montana	68	21	30.8	85,663,000	1,259,750
Maine	84	13	15.4	25,162,000	299,547
Nebraska	349	69	19.7	222,222,000	636,739
Nevada	15	10	66.6	19,214,000	1,280,933
New Jersey	165	36	21.8	24,589,000	149,024
New York	637	152	23.7	183,091,000	287,427
North Carolina	92	15	16.3	62,650,000	680,978
North Dakota	158	61	38.6	108,250,000	685,126
New Hampshire	58	9	15.5	11,910,000	205,344
Ohio	682	105	15.3	197,332,000	289,343
Oklahoma	288	8	2.7	152,433,000	529,281
Oregon	83	22	26.5	59,462,000	716,409
Pennsylvania	548	154	26.2	141,480,000	258,175
Rhode Island	33	6	18.1	3,276,000	99,272
So. Carolina	281	15	5.3	45,131,000	160,608
So. Dakota	180	31	17.2	127,229,000	706,827
Tennessee	173	14	8.1	110,706,000	639,919
Texas	437	33	7.5	318,647,000	729,169
Utah	31	9	29.0	28,782,000	928,451
Virginia	103	27	26.2	74,891,000	727,097
Vermont	83	12	14.4	22,643,000	272,807
Washington	125	29	23.2	48,865,000	390,920
West Virginia	251	13	5.1	43,336,000	172,653
Wisconsin	461	59	12.7	158,529,000	343,880
Wyoming	38	6	15.7	65,606,000	1,726,473

*Includes only those veterinarians in each state who have registered this year under the Harrison Narcotic Act, presumably all in active practice. Probably this does not include many municipal, state or federal employees or veterinarians connected with laboratories.

†From Year Book, U. S. Dept. of Agriculture, 1914, P. 642.

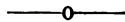
SOCIETY MEETINGS

BRITISH COLUMBIA VETERINARY ASSOCIATION

A public meeting on matters relating to the public health was held under the auspices of the British Columbia Veterinary Association in the Board of Trade Rooms, Victoria B. C. on Friday, May 19th, 1916, and was well attended both by the general public and the aldermen, councillors, and health officials of the city and surrounding districts.

The programme consisted of address of welcome by the President, Dr. S. F. Tolmie, explaining the objects of these public meetings. The first address was by Dr. Knight on Dairy Inspection in its relation to the Public Health. The second address was by Dr. Jagger entitled the Relation of the Veterinarian to the Public and to the Stockman. This was followed by an address by Dr. Jervis, illustrated by lantern slides made by himself, on meat inspection and its value to the public health, pointing out the limitations of the present system as far as inspection of locally consumed meat is concerned, and advocating civic inspection of all meat sold for food. Prof. McDonald, Provincial Live Stock Commissioner, then gave a short account of what occurred at the recent convention of the Pacific Northwest Association of Dairy and Milk Inspectors, which he attended, being retiring President of that Association. Various questions were asked the different speakers and interesting discussion and information followed, bringing a very successful meeting to a close.

K. CHESTER, Secretary.



VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY

MINUTES OF THE MARCH MEETING

The regular monthly meeting of this association was called to order by the president, Dr. Goubeaud at 8:45 p. m.

The prosecuting committee reported progress and stated that they had about \$600.00 in hand.

Dr. McKinney mentioned the fact that Dr. Wertheimer had been arrested for practicing illegally and said that his health is poor. Stated that he intends taking the State Board and suggested that prosecution be held in abeyance.

Dr. Griessman stated that Dr. Wertheimer has had ample time in the past two years since his last prosecution, to qualify and suggested that he be placed under bond until he takes the State Board examination.

Dr. Goubeaud then gave a very complete and detailed report of the Trichiniasis cases which have recently occurred at Far Rockaway, New York. Stated that in one family four deaths had occurred and said that the convulsions preceding death were horrible to witness and the pain intense.

Was present with Dr. Silkman, chief veterinarian of the department of Health at the Post-mortem examination and the worm was found in the deltoid muscle.

It is stated that if the female trichinia is swallowed it will give birth to from 1300. to 1500.

Hogs affected with this disease seem to thrive and do not show physical symptoms.

Dr. Chas. S. Chase of Bay Shore, New York, then read an interesting and instructive paper entitled "Interesting Characteristics of Animal Parasites".

Among others the doctor mentioned the evolution of the Bot fly, also the Tsetse fly, which causes sleeping sickness. Also mentioned the peculiar condition of the *Filaria immitis* or so called heart worm which leaves the internal organs for the periphery at night. Cited a clinical case in a dog, which could be plainly seen under the lens.

Also gave the history of the development of the common house fly, stating that it is estimated that the progeny of a pair of flies in one season will reach into the trillions.

The most fatal enemy of the fly is an intestinal fungus which by the formation of gases causes the death of the fly.

To the common fly can be traced the spread of such diseases as typhoid, anthrax, leprosy, ophthalmia, small-pox, diarrhea in children and may be the cause of parasitic diseases. The doctor urges all veterinarians to use every means in their power to destroy flies.

Exhibited a fine specimen of *Filaria immitis* removed from the heart of a dog.

Dr. Gannett mentioned lice and said that it is stated that blue ointment rubbed in back of the ears once every five days will rid the animal of lice.

A general discussion of azoturia then took place.

Dr. Goubeaud opened the discussion by citing several cases of this disease.

One of these cases, affected in the nigh front limb, was given oil and turpentine—exercised the next day, developed the disease behind, went down and died.

Another case was found on arrival to be nearly dead. Gave physic, olive oil and turpentine, got up the next day and made a good recovery. A third and fourth case was treated with arecoline in solution and small doses given orally every two hours with good results.

Dr. McKinney stated that following the last Christmas holiday season he had fourteen cases of azoturia and had excellent results from the result of physic, oil and turpentine and chloral hydrate. In some of these cases bleeding was resorted to, and the animals given four grains of morphine and one grain of strychnine.

Dr. Schroder mentioned an odd case of a horse that was down in the street for three hours, received a strong electric shock from a trolley, got up and recovered.

Dr. De Vine said that he uses salt and avoids irritation by adding syrup or some other mucilaginous mixture.

Mentioned one case in which femoral paralysis resisted treatment for a long time, had a second attack, was down for three days, got up and paralysis was gone.

Dr. Wolters stated that in the case of paralysis following azoturia, it is best to work the animal as soon as possible.

Dr. Goubeaud said that it is best to turn them out to pasture and keep them out. This opinion was endorsed by a number of those present. Dr. Gannett mentioned one case that had paralysis of both hind limbs. Turned out for eight months and recovered.

The question of certain breeds being more subject to this disease than others was also mentioned. Percherons are said to be more subject to this bane of horse flesh than the Clydes.

No one present however claimed to have found a specific for this peculiar disease, so after a short general discussion the meeting adjourned.

ROBT. S. MACKELLAR, Secretary.

The Connecticut Veterinary Medical Association will hold its summer meeting at the office of Dr. E. F. Schofield, at Bruce Park, Greenwich, Conn., July 25.

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY

MINUTES OF MEETING, MARCH 28, 1916.

A special meeting of this association was called by order of the president, Tuesday evening, March 28, 1916.

Dr. Goubeaud, who had just returned from Albany, explained that the object of the meeting was to devise ways and means of defeating the pending veterinary bills which had been introduced in both bodies of the state legislature.

Stated that in company with Drs. Berns, Ackerman; Way, Brotheridge, McKinney and Cochran, he had attended the hearing on these bills held by the Senate Committee.

Dr. Goubeaud said that the committee seemed convinced that this is special legislation and these bills should not have been introduced as the fact was brought out that one of these bills was introduced in the interest of J. L. Shorey of Schenectady, New York.

Owing to the possibility of these bills still being reported out of committee the following resolutions were unanimously adopted:

That this association goes on record as protesting against the passage of Senate Bill No. 537 now known as Senate Bill and Assembly Bill No. 709 now known as Assembly Bill No. 1041, and protest against the lowering of the standard of veterinary education and the requirement to practice veterinary medicine and surgery in the State of New York.

It was further resolved:

"That this resolution be referred to the Judiciary Committee directing them to draft a suitable letter to be printed, and sent to each member of this association, and all qualified veterinarians in New York City and vicinity, who in turn are to forward the same with a personal letter, to their representatives in the Senate and Assembly, or any others who are interested."

The secretary was also instructed to write Wm. A. Orr, secretary to the Governor, requesting him to notify the association at once should any of these bills be passed and come before the Governor for his signature.

Meeting adjourned:

ROBT. S. MACKELLAR, Secretary.

F. S. Jones, V.M.D. of the Rockefeller Institute is to go to Patagonia, South America to investigate a disease among sheep.

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY
MINUTES OF MEETING, APRIL 5, 1916.

The regular monthly meeting of the Veterinary Medical Association of New York City, was called to order by the President, Dr. Goubeaud, at 9 p. m.

Dr. D. H. Udall of the New York State Veterinary College had very kindly consented to make the journey from Ithaca, to address this meeting, and gave a very interesting and instructive talk on "Contagious Pleuro Pneumonia and Influenza."

The doctor described the conditions found in this disease from its inception. It is nearly always ushered in with a chill, temperature 105°, but sometimes a lower temperature is found. High pulse rate is always present.

The typical fever of lobar pneumonia is found.

Another characteristic is the high grade icterus of the membranes of the eye due to the breaking down of the blood and not to any disease of the liver. The lemon yellow exudate is also another peculiar symptom which is sometimes present.

Examination of the chest by striking a heavy hammer blow will immediately cause coughing.

Mortality ranges from four to twenty per cent.

Treatment depends largely on the condition of the heart.

The general treatment consists of the use of quinine, potassium iodide, oil of camphor under the skin, camphor, caffeine, digitalis;—good hygienic quarters, fairly warm and airy but no draughts.

In the Prussian army, salvarsan has been used quite extensively.

In Germany strict quarantine regulations are enforced at the very first when any suspicion of the disease takes place.

Dr. Udall then took up the subject of influenza and said that it is transmitted very easily and the incubation period is only forty or fifty hours. One attack is supposed to produce immunity, but this is not always the case. It is one of the predisposing causes of pleuro-pneumonia.

This disease is found most often during the winter and spring.

When Dr. Udall had concluded his interesting and instructive address a number of the gentlemen took part in the discussion.

Dr. Gill said that Dr. Udall had covered the subject very thoroughly and speaking of pleuro-pneumonia said that in the cases brought to his attention, the left side was much more tender than the right and on post-mortem more lesions are found on the left side.

Said there ought to be some Federal Regulations regarding this disease to protect innocent purchasers as influenza and its complications cause great financial loss to horse owners every year.

Dr. Berns said that he distinctly remembered the so-called epizootic of 1873 and said that it was characterized by a copious discharge from the eyes and nose, accompanied by sore throat but the mortality was low.

Dr. McCully also gave a short concise report of his experience with influenza.

Dr. Ackerman spoke of the use of the biologic products in this disease but said that in his hands the results were not satisfactory.

Stated that recently he had drawn blood from a horse and used the attenuated serum to re-inject the same animal with the result that a full recovery resulted in a week. This same serum was used in other horses with good results.

Dr. Kingston stated that he has very good results from the intravenous injection of a $2\frac{1}{2}$ to 5% solution of protargol. This it is stated will often give beneficial results and shorten the duration of the disease.

Dr. Ackerman asked in cases where digitalis is used if it does not cause or increase diarrhea. Dr. Gannet stated that in his experience it does not.

It was suggested that the attention of the proper authorities should be called to this disease and measures taken to prevent the great losses to horse owners. Crowded shipping conditions were also condemned.

A letter from Dr. J. G. Wills in which he called attention to Assembly Bill No. 1895 and urging this association and its members to oppose it was read.

It was on motion regularly made and seconded: That this association go on record as being opposed to the passage of Assembly Bill No. 1895 and that the secretary be instructed to write the chairman of the Assembly Public Health Committee informing him of the action of this association, unanimously carried.

The proposed amendments to the by-laws and code of ethics were then taken up.

Dr. Chase and others spoke against changing the date of the meetings of this association, and after a general discussion Dr. Gill moved that this resolution to amend the by-laws be referred back to the program committee for further consideration and to decide what is best for the interests of this association, seconded and carried.

The proposed amendment to the Code of Ethics making it a breach of the same for any member to employ a non-registered assistant, was after a rather lengthy discussion, not adopted.

Dr. Ackerman, chairman of the program committee, announced that at the May meeting Dr. Way had arranged to give an illustrated lecture, by the aid of moving pictures on "The Production and Handling of Clean Milk".

The secretary was instructed to invite the Commissioner of Health and other city officials as well as the heads of the different milk concerns and any others interested in this important work.

A rising vote of thanks was tendered Dr. Udall for his valuable contributions to the program of the evening.

Meeting adjourned:

ROBT. S. MACKELLAR, Secretary.

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COMMUNICATIONS

Editor of the Journal of the American Veterinary Medical Association, Ithaca, N. Y.

Dear Sir:—

I have read with much interest and pleasure the valuable article of Dr. K. F. Meyer entitled: Studies to Diagnose a Fatal Disease of Cattle in the Mountainous Regions of California.

The discussions of Drs. Dunphy, Eichhorn and Simms (on this subject) are most excellent; but that of Dr. Kinsley is of especial value.

It seems evident from the heading and throughout the whole article of Dr. Meyer that some doubt has been experienced concerning the nature of the disease. I quite agree that the symptoms of hemorrhagic septicemia in some cases are not well pronounced and do not throw much light upon the nature of the disease and may even offer in several instances points which lead to a mistaken diagnosis; but this as a rule does not apply to all cases of hemorrhagic septicemia, on the contrary many cases are readily recognized and a clinical diagnosis is not impossible. I may further state that I have the opportunity of dealing with several outbreaks of hemorrhagic septicemia in cattle and Barbone in buffalos and believe to have had no difficulty in diagnosing the disease. I must confess though that in all the cases I have observed, none presented the intestinal form. In cattle the pectoral form was nearly always seen independently and in rare cases accompanied with the exanthematous form; in buffalos the exanthematous or edematous was the only form seen: in this form the local swelling of the throat is so intense and prominent that no difficulty is exercised in giving a prompt diagnosis.

It is, by the way, interesting to note that owing to the later swelling the Egyptian (fellah) farmer calls the disease "Khonag" which means strangulation; this seems to be quite an appropriate name; as it indicates the seat of trouble and helps diagnosis.

Now for the bacteriological examination, I personally believe that the presence of the *B. bovissepticus bi polaris* in the blood or tissue of the affected animals is quite diagnostic of hemorrhagic septicemia. It is useless to collect blood films for examination unless the animal is at the point of death, as the blood is only then virulent; therefore it is more advisable to collect films from the gelatinous substance generally found in the edematous swelling of the throat. The inoculation of this gelatinous substance is supposed to kill rabbits in from 8 to 12 hours; and the organism of hemorrhagic septicemia in blood of inoculated rabbits is so abundant that it could be easily detected even without staining.

Piot Bey* seems to be quite convinced that the source of trouble in this affection is the watering of animals from stagnant water, and that is why he directed his attention and made some efforts towards digging wells near the bank of a canal, so as to get its water by filtration through a thick layer of earth or making some water pumps so as to allow the animals to drink pure and non-contaminated water. This way seems to put an end and stop the spread of the contagion. This has been tried for some years and seems to have answered quite satisfactorily in checking the further spread of the disease.

The mortality in cases of hemorrhagic septicemia in the locality where this way of watering was applied, amounts to 2-3%, while in places where this measure was neglected, the mortality went as high as 30 to 40%, bearing in mind that the sanitary police measures were properly carried through.

DR. J. E. AGHION,

Veterinary Inspector
State Domains, Sakha, Egypt.

THE NECESSITY OF A LIVE STOCK SANITARY COMMISSION OR BUREAU IN THE STATE OF NEW YORK.

Editor of the Journal of the A.V.M.A., Ithaca, N. Y.:

Under Chapter 9, of the Laws of the State of New York, Consolidated Laws, we have the Agricultural Law. This law deals with the title and general provisions of the fifteen articles, only one article, No. 5, deals with Diseases of Domestic Animals.

The Commissioner of Agriculture is not a veterinarian, nor physician, but must seek advice on disease of our domesticated animals from a veterinarian.

*Literature consulted: Le Barbone du Buffle, par J. B. Piot Bey, Directeur du service veterinaire. Domaines de L'Etat. Extrait du Bulletin de l'Institut Egyptien. Année 1889.

A large responsibility is imposed upon the commissioner, in his duties to look after dairy products; adulterated vinegar; prevention of fraud in the sale of Paris green and other substances; sale and analysis of concentrated commercial feeding stuffs; sale, adulteration or misbranding of food and food products; sale and analysis of commercial fertilizers; turpentine, linseed or flaxseed oils; apples, pears, peaches, quinces; State Fairs, and other miscellaneous duties.

In justice to the commissioner, it is advisable to create this new commission or bureau, where the live stock problem of this state, could be handled and so regulated as to be of extreme benefit to the state and to the public.

Quoting from a bulletin of the United States Census, for the State of New York, I use their figures. In 1900, the value of live stock, New York State, was \$125,583,715; in 1910, the value was \$183,090,844, showing an increase of 45.8%. This increase is given as 44.7% of live stock during the same period, but the major percentage is 82.8% in poultry value and poultry stock.

We have a decrease in all cattle in this state, a total of 173,386 in ten years. There is a slight increase of 7986 dairy cows. A decrease of 37,430 horses in ten years, not including the amount of horses that have been exported during the past year and a half to the warring European nations; a decrease of 10,460 swine, and a very large decrease of 615,446 sheep.

There has been a general decrease in the live stock in this state as is shown, and, as I am given to understand, a very large decrease in all live stock from 1910 to 1915.

Under our present Agricultural Law, the owners of cattle and horses are indemnified for the slaughter of cattle suffering with tuberculosis, and horses infected with glanders.

From 1909 to 1915, 17,146 cows were slaughtered suffering with tuberculosis for which the State of New York paid \$812,944.43 in six years and during the same time 7221 horses were killed, diseased with glanders for which the state also paid \$494,524, making a total of \$1,307,468.43 in return for which these owners did not even contribute a single cent.

I propose and suggest a direct tax on the owners of live stock, as they are the only ones benefitting by the state indemnity.

We have, according to the figures below, the following live stock in this state and a small tax per head will bring an income into the state treasury of over \$3,000,000 a year.

Horses	591,008.	Proposed tax \$1.00 each	\$ 591,008.00
Cattle	2,423,003.	Proposed tax .50 each	1,211,501.50
Dairy Cows	1,509,594.	Proposed tax .50 each	754,797.00
Swine	666,179.	Proposed tax .25 each	166,544.75
Dogs	350,000.	Proposed tax 1.00 each	350,000.00
(my figures)			

\$3,073,851.25

This additional income to the state would defray the expense of this department and leave a sum of money approximately about \$2,000,000 to indemnify for the actual loss of tubercular cows, glandered horses and diseased swine.

I suggest that there be three directing veterinarians at a proposed salary of \$3500.00 and field veterinarians, one hundred or more at \$1800; experiment stations for the study of these diseases, state laboratory at the State Veterinary College for the examination of specimens, for the analysis of blood, the manufacture of immunizing serums, anti-toxins and viruses.

The Commission or Bureau should have the absolute right and power to control the suppression and eradication of contagious or infectious diseases of animals in this state, and to work in harmony with the animal division of the United States Department of Agriculture. The definite law or regulation as to the quarantine of animals; the compulsory testing of cows and horses for contagious or infectious diseases; regulating the shipping of live stock into and without the state and within the state from one county to another county; the issuing of live stock health certificates; that no horse, cow or pig could be sold without a health certificate, issued by the said bureau.

Inasmuch as the public has the benefit of the Pasteur treatment at the expense of the state, it is just that the owner of a dog shall pay to the state a tax of one dollar a year, and that the commission shall have the power to keep all dogs muzzled, so that rabies shall be entirely wiped out of the state of New York.

The directing veterinarians shall lecture on live stock, on the question of breeding, suppression of disease, sanitary conditions and good meat supply. The bureau or commission shall have the supervision of the local slaughtering houses for the inspection of meat.

Employment of veterinarians shall be from the state civil service list, and all veterinarians required to report once a year in writing as to their post office addresses.

Bulletins shall be sent out at such times to all veterinarians, informing them of any change in rules or regulations.

Veterinarians shall have control as to the testing of live stock and in the event of their failure to make true and accurate tests and reports, to have the right to have the individual veterinarians' licenses revoked.

It shall be a misdemeanor for anyone other than a licensed or registered veterinarian to inject any tuberculin, mallein or virus or toxin for the purpose of establishing the fact that said animal is suffering from any disease.

The various health departments or bureaus in the different cities or towns, having veterinarians in their employ shall come under the supervision of the said commission or bureau, and they shall do the work as if in the employ of this commission or bureau,

and the head of that division shall make weekly reports to this commission.

The reason for the above is that it shall not be necessary for two departments to do one act, and the state shall not be encumbered with the payment of a salary for unnecessary work that is and had been performed by the local health bureaus.

The control and shipment of the manufacture of antitoxins, vaccines, or any serums shall come under the supervision of this department, that is, where they are manufactured within the state, or that the standard of any such vaccines or antitoxins must come up to the standard of the United States Bureau of Animal Industry.

Any fake remedy for the so-called cure of diseases in animals shall be under control.

There shall be compensation to veterinarians for the reporting of any contagious or infectious diseases.

LOUIS GRIESSMAN

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Editor of the Journal of the American Veterinary Medical Association, Ithaca, N. Y.

Enclosed herewith please find my personal check for two dollars (\$2.00) with which to be the nucleus and start a fund for the expense necessary to have moving pictures made for the A.V. M.A. and subsequent state meetings, of the various operations by expert veterinarians as indicated in the close of the paper which I gave at the Missouri Valley Veterinary Medical Association in July, 1914, entitled "The Sturdy Farm Boy, etc."

I note that the idea was successfully carried out at the American Medical Association and the veterinary profession ought to be able to do the same.

BURTON R. ROGERS.

[EDITOR'S NOTE:—Dr. Rogers' communication reached us just before the later forms of the *Journal* went to press. In order that the idea may not be delayed we are publishing his letter. If other donations are received they will be held until some definite plan is arranged. If the plan does not materialize the donations will be returned to the senders.]

The mid-summer meeting of the Illinois State Veterinary Medical Association will be held at Peoria, Ill., July 19th. The officers are F. H. Burt, president; A. W. Smith, vice-president; L. A. Merillat, secretary-treasurer. The annual meeting will be held at Chicago, Ill., December 5, 6, and 7.

The next meeting of the Montana Veterinary Medical Association will convene in the Capitol Building, Helena, September 27 and 28.

REVIEWS

VETERINARY THERAPEUTICS

E. WALLIS HOARE

Alex. Eger, Publisher, Chicago, Ill.

This book is now in the third edition. It contains 943 pages and covers the greater part of the entire subject of Veterinary Therapeutics. The text is divided into three parts.

Part. I. This contains chapters on the general diagnosis of diseases; care, management, and nursing of sick animals; actions and uses of drugs and veterinary pharmacy.

The chapter on general diagnosis of diseases treats of the usual physical examination, examination of the urine and an interpretation of various symptoms of disease. The ground is covered quite thoroughly but of course is not so complete as the usual texts on the various subjects.

The chapter on the care, management and nursing of sick animals includes specific directions for each group of patients, including birds. It is composed of several articles by different men who are evidently specialists on the various subjects. Thus, Hoare is probably the author of that part pertaining to horses, Hugh Begg, for cattle; Henry for dogs, cats and birds and G. Mayall for sheep and swine. These articles are all very complete and contain a vast amount of information not usually found in such a book, although there is considerable material which is foreign to the subject.

The sections on the actions and uses of drugs includes discussions on the general effect of drugs, methods of administration and a brief discussion of the different classes of drugs grouped according to their action. The last part is very brief and amounts to but little more than definitions and examples in many cases.

Part II. *Materia Medica*. This is really pharmacology and general therapeutics. It discusses the physiological actions and the uses of the individual remedies which are of importance in veterinary medicine. The author has included, not only most of the official and more popular drugs, but many proprietary and semi-proprietary remedies. The subject matter is fairly complete, but the grouping is such in many cases as to render it difficult as a text.

Part III. This part is devoted to the treatment of those diseases most commonly found in veterinary practice, minor surgical operations and a formulary of prescriptions for various ailments.

The final chapter on vaccine therapy is written by W. M. Scott and includes a valuable discussion on immunity together with articles on the more commonly used immunizing agents. The diseases are grouped under the general headings: diseases of the digestive system, etc., and sub-headings devoted to the different species of animals, horses, cattle, dogs, etc. The greatest emphasis is based upon the treatment of the various diseased conditions, but, in many cases, the causes and symptoms of the disorders are briefly reviewed.

The minor surgical operations include such common operations as firing, passing the probang and stomach tube, puncturing the intestines and rumen, and catheterization. Very exact directions are given for these procedures, but the reviewer is not competent to give an opinion of them. It seems, however, that the average practitioner, should already be familiar with most of the operations described and this text cannot in any way take the place of several texts on surgery.

Finally, there is an appendix of some 40 pages of formulae for various conditions.

Veterinary Therapeutics is evidently a valuable addition to veterinary literature but, in the opinion of the reviewer, attempts to cover too briefly many subjects which are more thoroughly discussed in special texts on the subjects, and with which practicing veterinarians should already be fairly familiar. Furthermore, it does not appear that it can take the place of our texts on physical diagnosis, urine analysis, pathology and surgery, so that certain parts although exceedingly valuable should not be utilized as text books.

This book should prove valuable to any practitioner, although unfortunately the subject matter and prescriptions are based upon the British Pharmacopoeia instead of that of the United States, a fact that will tend to cause confusion to American Practitioners or pharmacists.

The Maine Veterinary Board of Examiners met for the purpose of organization in Augusta on June 14. Dr. I. L. Salley of Skowhegan was elected president. Dr. W. H. Lynch of Portland was elected secretary, Dr. W. H. Robinson of Woodfords, treasurer. A meeting of this board for the reception of candidates will be held in the last week of July at Augusta.

NECROLOGY

A. L. HOISINGTON

Dr. A. L. Hoisington died in March at Fremont, Ohio.

ROY N. DRAKE

Dr. Roy N. Drake of Reno, Nevada, a member of the A.V.M.A., died April 11, 1916. Dr. Drake was a graduate of the College of Veterinary Medicine at Cincinnati, Ohio, in 1898.

CHARLES H. BAGNELL

Dr. Charles H. Bagnell, a graduate of the Chicago Veterinary College, aged forty-six years, died at Oil City, Pa., June 7, following an attack of tonsillitis.

HENRY GAY CARPENTER

Henry Gay Carpenter, publisher of veterinary text books, died suddenly at Ithaca, N. Y., June 21. Mr. Carpenter although handicapped by ill-health for several years devoted himself to his business until the end. Those privileged to know Mr. Carpenter, and who have experienced his uniform courtesy in business affairs, can testify to his interest in matters pertaining to the veterinary profession. As a friend he was considerate and unselfish and his loss is to be greatly deplored.

The Fourth Annual Report of the Commissioner of Animal Industry for the Commonwealth of Massachusetts has been received. It is a neat cloth bound volume of 62 pages in which Commissioner Lester H. Howard gives much useful information.

Nine applicants took the examinations given by the State Board of Veterinary Medical Examiners of Montana, May 15 and 16. The following have been granted licenses: N. T. Gunn, Butte; L. G. Helterline, Plains; E. S. Mohr, Plentywood; I. W. Vinsel, Plevna; Chas. H. Wight, White Sulphur; H. F. Wilkins, Laurel.

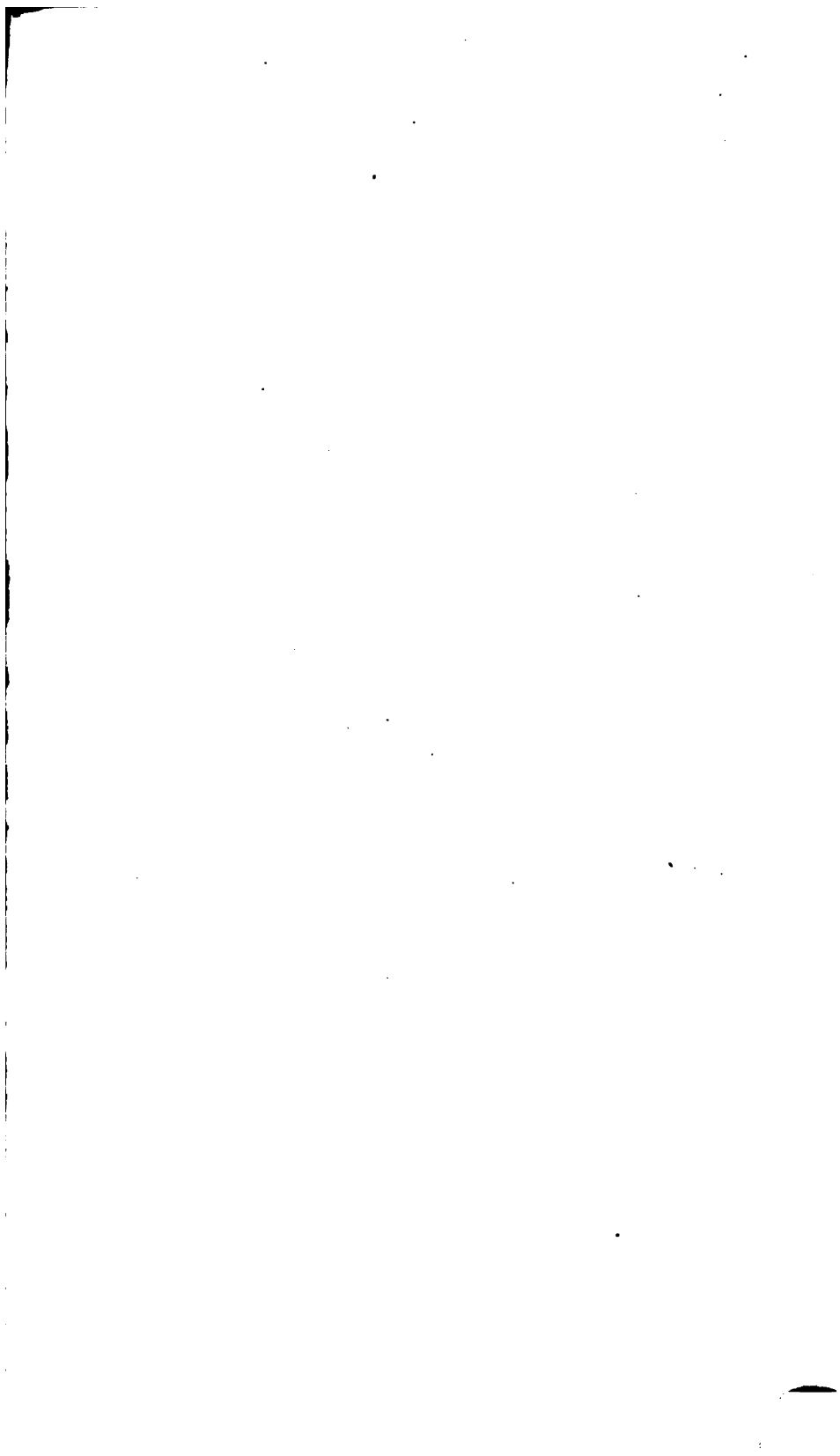
The Southern Tier Veterinary Medical Association will hold its annual meeting at Owego, N. Y., July 1. The forenoon clinic will be held at the hospital of Dr. Vorhis. The program in the afternoon includes papers by Doctors De Vine, Zimmer, Pearce and Caslerline.

VETERINARY MEDICAL ASSOCIATION MEETINGS

The accompanying table the data given is reported by many Secretaries as being of value to their Association, and it is to be regretted that some neglect to inform us dates and places of their meetings.

Secretaries are earnestly requested to see that their organizations are properly included in the following list:

Name of Organization	Date of Next Meeting	Place of Meeting	Name and Address of Secretary
Ala. Vet. Med. Ass'n.	.....	Auburn	C. A. Cary, Auburn
Ala. Vet. Med. Ass'n. College of Vet.	.....	.....	W. R. Hobbs, care O. & N.
Ala. O. S. U.	1917, Jan. 10..	Columbus.....	Columbus, Ohio.
Ala. Ass'n, N. Y.-A. V. C. ....	.....	141 W. 54th St.	P. K. Nichols, Ft. Richmond
Ala. Ass'n U. S. Coll. Vet. ....	.....	.....	.....
Ala. Poultry Ass'n.	April 14, 1917	Wash., D. C....	C. M. Mansfield, Wash., D. C.
Ala. V. M. Ass'n.	1916 Aug. 21-25	Detroit, Mich...	C. M. Haring, Berkeley, Cal.
Ala. Veterinary Ass'n.	Jan., 1917	Little Rock	R. M. Gow, Little Rock
Ala. Vet. In. A., Chicago.	2d Fri. each mo.	Chicago	Chas. E. Schneider, Chicago
Ala. Vet. In. A., S. Omaha.	3d Mon. each mo.	S. Omaha, Neb..	J. V. Giffe, So. Side, Omaha
Ala. Can. Vet. Ass'n.	Monthly	St. Joseph	F. W. Caldwell, St. Joseph, Mo.
Ala. State V. M. Ass'n. ....	.....	.....	F. M. Hayes, Davis
Ala. Canada V. Ass'n.	Feb. and July..	Ottawa	A. E. James, Ottawa
Ala. N. Y. Vet. Med. Ass'n.	June and Nov..	Syracuse	W. B. Switzer, Oswego
Ala. O. Vet. Society.	2d Tu. each mo.	Chicago	D. M. Campbell, Chicago
Ala. O. State V. M. Ass'n. ....	.....	.....	I. E. Newsom, Ft. Collins
Ala. O. Vet. Med. Ass'n.	1916, July 25..	Greenwich	A. T. Gilyard, Waterbury
Ala. O. State Vet. Society.	Jan. Ap. Jul. Oct.	Wilmington	A. S. Houchin, Newark, N. J.
Ala. O. Co. (N. J.) V. M. A.	3d Mon. each mo.	Newark, N. J..	J. F. Carey, E. Orange, N. J.
Ala. O. Valley V. M. Ass'n. ....	.....	Rochester	O. B. Webber, Rochester
Ala. O. State V. M. A.	1916, Aug. 23-24	Savannah	P. F. Bahnsen, American
Ala. O. Co. (Ohio) V. A. ....	.....	.....	Louis P. Cook, Cincinnati
Ala. O. Valley V. M. A. ....	.....	Hudson	W. H. Kelly, Albany
Ala. O. Ass'n Vet. graduates.	1917, Feb. 4-5..	Boise	C. V. Williams, Blackfoot
Ala. O. Vet. Med. Ass'n.	1916	E. St. Louis	L. B. Michael, Collinsville
Ala. O. State V. M. Ass'n.	1916, July 19..	Peoria, Ill.	L. A. Merrillat, Chicago
Ala. O. Veterinary Ass'n.	1917, Jan. 9-10	Indianapolis	A. F. Nelson, Indianapolis
Ala. O. Veterinary Ass'n.	1916	Des Moines	H. B. Treman, Rockwell
Ala. O. State V. M. Ass'n.	Jan. 3-4, 1917.	Wichita	J. H. Burt, Manhattan
Ala. O. Ky V. M. Ass'n.	Oct. & Feb.	Lexington	Robert Graham, Lexington
Ala. O. Ne V. M. Ass'n.	2d Tu. each mo.	Philadelphia	C. S. Rockwell
Ala. O. rie V. M. Association.	Pending .....	.....	Phil. H. Fulstow, Norwalk
Ala. O. na State V. M. Ass'n.	1916	Lake Charles	Hamlet Moore, N. Orleans
Ala. O. Vet. Med. Ass'n.	1916, July 12..	Portland	M. E. Maddocks, Augusta
Ala. O. nd State Vet. Society. ....	.....	Baltimore	H. H. Counsellman, Sec.
Ala. O. ussetts Vet. Ass'n.	4th Wed. ea. mo.	Young's, Boston	E. A. Cahill, Lowell, Mass.
Ala. O. un State V. M. Ass'n.	1916	Lansing	W. A. Ewalt, Mt. Clemens
Ala. O. ta State V. M. Ass'n.	July 12-13	Minneapolis	G. Ed. Leech, Winona
Ala. O. ppi State V. M. Ass'n.	1917 Jan. 10, 11	Clarksdale	E. S. Norton, Greenville
Ala. O. ppi Valley V. M. Ass'n.	Semi-Annually	Galesburg, Ill..	G. E. McIntyre, Alexia
Ala. O. i Valley V. Ass'n.	1916, July 10-11-12	Omaha, Neb..	R. F. Bourne, Kansas City
Ala. O. i Vet. Med. Ass'n.	1916 .....	.....	Chas. D. Folse, Kansas
Ala. O. a State V. M. A.	1916	Bozeman	A. D. Knowles, Missoula
Ala. O. ss'n B. A. I. Employees.	1916	New York, N. Y.	S. J. Walkley, 185 N. 4th Ave., Milwaukee, Wis.
Ala. O. rk S. V. M. Soc'y.	1916 Aug. 2-4..	Ithaca	C. P. Fitch, Ithaca, N. Y.
Ala. O. 'arolina V. M. Ass'n. ....	.....	Wrightsville Beach, N. C..	J. P. Spoon, Burlington
Ala. O. akota V. M. Ass'n.	1916, July 18-20	Fargo	W. J. Mulreony, Havana
Ala. O. Western Ohio V. M. A.	1916	Toledo	Paul E. Woods, Ottawa
Ala. O. ate V. M. Ass'n.	1917, Jan. 11-12	Columbus	F. A. Lambert, care O. & N. Columbus, Ohio.
Ala. O. c. of Comp. Med.	Annually	Upper Sandusky	F. F. Sheets, Van Wert
Ala. O. lley Vet. Med. Ass'n. ....	.....	.....	G. J. Behrens, Evansville
Ala. O. na V. M. Ass'n.	Fall, 1916.	Omaha City.	C. E. Steel, Oklahoma
Ala. O. Vet. Ass'n.	1916	Toronto	L. A. Wilson, Toronto
Ala. O. vania State V. M. A. ....	.....	.....	T. E. Munce, Harrison





R. A. ARCHIBALD

**President of the American Veterinary Medical Association
1915-1916**

JOURNAL

OF THE

American Veterinary Medical Association

Formerly American Veterinary Review

(Original Official Organ U. S. Vet. Med. Ass'n)

PIERRE A. FISH, Editor

ITHACA, N. Y.

Committee on Journal

F. TORRANCE, *Chairman*, A. EICHORN, *Secretary*, C. J. MARSHALL, W. R. BLAIR, R. A. ARCHIBALD, M. JACOB, N. S. MAYO, G. R. WHITE, V. A. MOORE, L. FROTHINGHAM, C. H. STANGE, H. JENSEN, G. H. ROBERTS, R. P. LYMAN.

Sub-Committee on Journal

C. J. MARSHALL, *Chairman*, R. P. LYMAN, A. EICHORN, *Secretary*

The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

VOL. XLIX. N. S. VOL. II.

AUGUST, 1916.

No. 5.

Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary C. M. Haring, University of California, Berkeley, California. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

OFFICIAL PROGRAM OF THE A. V. M. A. FOR THE DETROIT MEETING

MONDAY MORNING, AUGUST 21

Meeting of the Executive Committee at 8:00 A. M. in Parlor C, Hotel Statler. Persons who desire a hearing are requested to report at this time.

OPEN MEETING—10:30 A. M.

Detroit Board of Commerce Auditorium.

Call to Order by the President.

Address of Welcome to Michigan,

Hon. Woodbridge N. Ferris, Governor of Michigan.

Address of Welcome to Detroit, Oscar B. Marx, Mayor of Detroit.

Response to Address of Welcome.

Address by the President, R. A. Archibald, Oakland, California.

Roll Call.

Submission of the Minutes of Previous Meeting as published in the
Journal.

Report of the Executive Committee,

Unfinished Business.

MONDAY AFTERNOON, AUGUST 21—2:00

Detroit Board of Commerce Auditorium.

Unfinished Business.

Report of the Executive Committee.

Report of the Secretary—C. M. Haring.

Report of the Treasurer—F. H. Schneider.

Report of the Librarian—J. N. Frost.

Report of the Committee on Diseases—J. R. Mohler, Chairman.

The Efficiency of the Various Disinfectants,

Charles H. Higgins.

Hemorrhagic Septicemia in Cattle in the Middle Section of the United States,

A. T. Kinsley

Hemorrhagic Septicemia with Special Reference to its Economic Importance

J. R. Mohler

Non-Specific Treatment of Infectious Diseases in Animals,

K. F. Meyer.

A Study of the Milk in Bovine Infectious Abortion.

Ward Giltner.

(This paper will be read by title and referred to the Chairman of the Section on Sanitary Medicine to be read at the proposed symposium on that disease).

Report of Committee on Intelligence and Education—N. S. Mayo, Chairman.

Report of the Committee on Re-Organization—C. A. Cary, Chairman.

MONDAY EVENING, AUGUST 21—8:00

Reception and Ball in Ball Room, Hotel Statler.

TUESDAY MORNING, AUGUST 22—9:30

Report of the Executive Committee.

Report of the Committee on Finance—E. L. Quitman, Chairman.

Report of the Committee on Necrology—H. Jensen, Chairman.

Report of the Committee on Salmon Memorial—J. F. Winchester.

Report of the Committee on Selection of Emblem—Otis A. Longley, Chairman.

Report of the International Tuberculosis Commission—J. G. Rutherford, Chairman.

Report of the Committee on Journal—F. Torrance, Chairman.

Report of the Committee on Advertisements of Veterinary Remedies—M. Jacob, Chairman.

Report of the Special Committee on Agricultural College Investigation—F. B. Hadley, Chairman.

Report of Committee on Glanders—E. B. Ackerman, Chairman.

Report of the Special Committee on Veterinary Nomenclature—S. Sisson, Chairman.

TUESDAY AFTERNOON, AUGUST 22—2:00

Joint meeting of all Sections in Ball Room, Hotel Statler, to hear papers on infectious abortion. For detailed program see page 632.

TUESDAY EVENING, AUGUST 22—8:30

Meetings of various Alumni Associations and Class dinners.

WEDNESDAY MORNING, AUGUST 23—9:30

Meeting of the Section on General Veterinary Practice in the Ball Room on the second floor, Hotel Statler. For detailed program of this Section, see page 634.

Meeting of the Section on Sanitary Science and Police in the Banquet Room on the second floor, Hotel Statler. For detailed program of this Section, see page 635.

WEDNESDAY AFTERNOON, AUGUST 23—2:00

Meeting of Section on General Veterinary Practice in Ball Room on the second floor, Hotel Statler. For detailed program of this Section, see page 634.

Meeting of the Section on Sanitary Science and Police in Banquet Room on the second floor, Hotel Statler. For detailed program of this Section, see page 636.

WEDNESDAY EVENING, AUGUST 24—7:30

Banquet in the Banquet Room, Hotel Statler.

THURSDAY, AUGUST 24

The entire Association, including ladies and all registered visiting veterinarians, will leave on the steamer Britannia for Parke. Davis & Company's plant on the river front. During the entire day the association will be guests of that company. They will visit the Laboratories and sail on the Lake and the River St. Clair.

THURSDAY EVENING, AUGUST 24—7:30

Ball Room, Hotel Statler.

Report of the Committee on Legislation—David Buckingham, Chairman.

Report of the Committee on Resolutions—John W. Adams, Chairman.

Further Report of the Committee on Re-Organization.

Report of the Committee on History—James Law, Chairman.

Reports of Delegates to Conventions.

Unfinished Business.

New Business.

Election of Officers—1, President; 2, First Vice-President; 3, Second Vice-President; 4, Third Vice-President; 5, Fourth Vice-President; 6, Fifth Vice-President; 7, Secretary; 8, Treasurer; 9, Librarian.

FRIDAY, AUGUST 25

General Assembly of the Association.

Unfinished Business.

Installation of Officers.

Clinic and Demonstrations throughout the Day.

Adjournment.

SATURDAY, AUGUST 26

The members of the Association who will be passing through Chicago have been invited by Sears, Roebuck and Company to visit their establishment at 10:30 A. M. and be their guests at luncheon.

LITERARY PROGRAM**TUESDAY AFTERNOON, AUGUST 22—2:00**

Joint Session of all Sections in Ball Room on the second floor of Hotel Statler.

SYMPOSIUM, CONTAGIOUS ABORTION

1. The Death and Expulsion of the Immature Fetus as a Standard for Measuring the Prevalence of Infection of Cattle Abortion.
W. L. Williams, Ithaca N. Y.
2. Some of the Advantages of Sanitary Precautions in Cattle Breeding.
John F. DeVine, Goshen, N. Y.

3. Contagious Abortion from the Practitioners' Standpoint.

C. A. Cotton, St. Paul, Minn.

4. The Bull as a Disseminator of Contagious Abortion.

F. B. Hadley and H. Lothe, Madison, Wis.

Now that the causative organism of contagious abortion of cattle has been isolated and reliable methods of diagnosis have been perfected, means are at hand to control accurately and to interpret correctly the results of experiments designed to shed light upon the question of the ability of both mechanically infected and systemically infected bulls to transmit abortion by cohabitation.

This paper discusses an experiment, based upon practical and scientific knowledge, in which abortion-infected bulls were bred to non-infected virgin heifers.

The authors among other conclusions state:

- (1) That the bull is less susceptible to abortion infection than the cow.
- (2) That if the bull does become naturally infected by the abortion bacilli the infection usually runs a course much more benign than in the cow.
- (3) That the soiled bulls with systemic infections used in the experiments were incapable of disseminating the abortion disease by cohabitation.

5. A Study of the Milk in Bovine Infectious Abortion.

Ward Giltner, L. H. Cooledge and I. F. Huddleson, Lab.
of Bact. and Hygiene, East Lansing, Michigan.

The paper deals with various aspects of cows' milk in its relation to bovine infectious abortion and to human health. It is shown that the introduction of *Bact. abortus* into the udder of a cow causes the appearance of agglutinins in the milk; that agglutinins are always found in milk capable of producing typical lesions of *Bact. abortus* in the guinea pig, but that the reverse is not true. No proof is found that *Bact. abortus* is pathogenic for man, but antibodies for the microorganisms appear in the blood of man as a result of feeding naturally infected milk, probably representing a passive immunity in man. Results are reported also on the, (1) effect of feeding infected milk to rabbits; (2) to guinea pigs; (3) to new born calves; (4) significance of the matting of the hairy tufts around the sheath and vulva of calves.

6. The Present Status of the Abortion Question.

Adolph Eichhorn, Chief of Pathological Division, Bureau
of Animal Industry, and Geo. M. Potter, Veterinary
Inspector, Bureau of Animal Industry, Path. Division.

This paper recounts briefly the history of the disease, quoting authors and setting forth the essential contributions of each; points out the difficulties associated with the investigation of the question; reports some of the work, and conclusions of the Bureau of Animal Industry; and finally outlines methods which have been in a measure successful in controlling the disease.

7. Discussion to be opened by V. A. Moore, Ithaca, N. Y.

8. Experiments with Equine Abortion.

J. B. Hardenbergh, Philadelphia, Pa.
(Ten minutes)

This paper outlines experiments in connection with equine abortion. It also gives data relative to the vaccination practiced in this disease and also ophthalmic experiments.

WEDNESDAY MORNING, AUGUST 23—9:30

Ball Room, on second floor, Hotel Statler.

SECTION ON GENERAL VETERINARY PRACTICE

L. A. Merillat, Chicago, Chairman.

1. Lost Opportunities. David S. White, Columbus Ohio.
2. Local Anaesthesia in Animal Dentistry.
H. E. Bemis, Ames, Iowa.
3. Teaching Pharmacology. H. Jensen, Kansas City, Missouri.
4. Business Methods in a Veterinary Practice.
D. M. Campbell, Chicago, Illinois.
5. Topographic Anatomy of the Anterior Part of the Head—An Illustrated Lecture
H. S. Murphey, Ames, Iowa.

WEDNESDAY AFTERNOON—2:00

Ball Room on second floor, Hotel Statler.

1. Shipping Fever of Horses. J. R. Mohler, Washington, D. C.
2. Shipping Fever of Horses from the Army Standpoint.
C. J. Willgans, Kansas City, Mo.
3. Shipping Fever as Seen from a Large City Practice.
G. B. McKillip, Chicago, Ill.
4. Nymphomania of Mares. H. Fulstow, Norwalk, Ohio.
5. Paraphimosis of Domesticated Animals.
J. V. LaCroix, Kansas City, Mo.
6. Surgery of Paraphimosis. John Adams, Philadelphia, Penna.
7. Recommendations for the Control of White Scours.
A. T. Kinsley, Kansas City, Mo.
8. Some Physiological Experiments in Breeding.
H. D. Bergman, Ames, Iowa.
9. Treatment of Equine Pneumonia R. C. Moore, St. Joseph, Mo.

WEDNESDAY MORNING, AUGUST 23,—9:30.

Banquet Room on the second floor, Hotel Statler.

SECTION ON SANITARY SCIENCE AND POLICE

C. H. Higgins, Ottawa, Chairman.

1. Osteomalacia or "Cage Paralysis" in Primates.
W. Reid Blair, New York, N. Y.

2. Studies in Canine Distemper.
John A. Kolmer, John Reichel, George H. Heist and
Malcolm J. Harkins.

(From McMann's Laboratory of Experimental Pathology, University of Pennsylvania, Philadelphia, Pa., and Mulford Biological Laboratories, Glenside, Pa.)

3. Hypodermal Anaphylaxis.
S. Hadwen, Veterinary Research Laboratory, Agassiz, B. C.
(Lantern slide demonstration of experimental data).

4. Hog-Cholera, Transmission Through Infected Pork
R. R. Birch, Ithaca, New York

This paper deals with the possibilities of spreading hog cholera by means of infected pork trimmings in garbage. It includes experimental data obtained by killing hogs in various stages of hog cholera, and feeding small portions of the hams from which the samples were taken when fresh, while others were refrigerated or cured before portions were removed for feeding. Special consideration is given to the relation between meat inspection and this means of hog cholera transmission.

5. Results of the Use of Hog Cholera Globulin on 3,000 Hogs in the Field
Robert Graham, Lexington, Ky.
(Ten minutes)

Hog cholera globulin was used under field conditions in controlling hog cholera in infected herds as well as herds apparently free from the infection. In non-infected herds virus was simultaneously administered in conjunction with the globulin. Hogs immunized by the simultaneous method were later hyperimmunized in some instances. Comparative results of the use of hog cholera globulin and unrefined hog cholera serum indicated that hog cholera globulin in small doses has protective powers against hog cholera equal to those of the unrefined serum.

6. Further Studies with Hog Cholera with Reference to Spirochaeta Hyos

Walter E. King and R. H. Drake, Detroit, Mich.
(Ten minutes)

7. The Follow-Up and Combined Systems of Tuberculin Testing

George H. Hart and J. Traum

Data showing that no one method will produce 100% reactions in tuberculous cattle and that probably 85% represents the efficiency by the ordinary technic used in routine work. Tuberculous cattle frequently react to one form of the tuberculin test and not to others.

In the elimination of tuberculosis from certified and accredited herds the writers advocate the combined method of tuberculin testing, using three methods at once or, preferably, if time permits, the *follow-up system*, by applying the ophthalmic test twice at intervals of one week, followed immediately by the intradermal method, and after the lapse of three or four weeks testing by the subcutaneous method all animals that have not been removed by the previous tests.

In routine testing in certified herds alternate semi-annual tests by the subcutaneous and intradermal methods have been used, supplemented by the follow-up method in those herds where over 5% of reactors were found to be present. The intrapalpebral method is considered to be in principle practically the same as the intradermal. In practice we have found the injection required more time than labor, and was objected to by cattle owners as causing too much disturbance in the barn. Slight local reactions in the subpalpebral injection are more difficult to recognize than those in the subcaudal fold and there is a higher percentage of doubtful cases to retest.

8. Studies in Forage Poisoning

Robert Graham and L. R. Himmelberger
(Ten minutes)

Continuing bacteriological studies of an oat hay which proved poisonous to horse and mule stock, previously reported at the United State Live Stock Sanitary Association meeting 1915. The pathogenic properties of a bacillus isolated from the oat forage as well as from another forage in a remote outbreak are described. Small animals, including guinea pigs, rabbits, chickens and white mice, were apparently immune while horses were apparently susceptible. Bovines, sheep, and goats less so. Filtrates of this bacillus grown in Uschinsky's protein-free medium on being injected intravenously into horses from day to day resulted in manifest symptoms, coma and death.

WEDNESDAY AFTERNOON—2:00

SECTION ON SANITARY SCIENCE AND POLICE

Banquet Room on the second floor, Hotel Statler.

ARMY SERVICE, REMOUNTS, HORSE BREEDING AND ALLIED TOPICS

1. An Army Veterinary Corps C. J. Marshall, Philadelphia, Pa.

By a Veterinary Corps is meant a department of the army having its own organization and head.

Its purpose is to insure the purchase of sound horses and care for those that are injured, sick or inefficient. In order to be of the greatest value in reducing the amount of suffering to the minimum, in preventing the spread of

transmissible diseases to animals and human beings in the army and in civil life during the war and after it is ended, in removing from the fighting and working lines the animals that are not able to work and thereby interfere with progress, it is imperative that a sufficient number of men should be properly educated, organized, equipped and clothed with abundant authority.

From observations made in the field the Veterinary Corps is the most efficient organization for looking after this important branch of the Army Service. All charity and assistance contributed by humane societies or individuals to alleviate the suffering of animals should be conducted and handled under the supervision of the Veterinary Service.

2. The National Horse

R. Vans Agnew, Army Service School, Fort Leavenworth, Kansas.

The improvement of the present stock for breeding the light horse. The giving of government premiums in all states for the best type of stallion, mare and foal. The present remount depots and the class of animals sent to them. The fallacy of the present contract system. The evil of shipping fever in connection with it. Some suggestions for a remount organization to take the place of the contract system. Cooperation from the State Veterinarians and Agricultural Farms. The types and their crosses for remounts. What has been done in some states to improve the type. The real type and what it is called upon to do in peace and war.

3. Remounts, their Care in Depots and in Transit

D. Warnock, British Remount Station, Dixie, Que.

4. Remounts

Jas. N. Hornbaker, Front Royal, Va.

In the papers announced there will be new developments concerning infectious abortion, tuberculin testing, canine distemper and non-specific methods of treating infectious diseases. A discussion of Duval's prophylactic for hog cholera will be arranged if possible.

Beyond the fact that every effort will be made to have the clinic up to its usual high standard, it can be stated, at this time, that among the new things to be demonstrated are: William's uterine irrigations; Bemis's dental anesthesia; and McKillip's ventricular cauterization for roaring.

After August 7th, address all communications to the American Veterinary Medical Association, Hotel Statler, Detroit, Michigan. By that date the president and secretary will be en route from California. Beginning August 18, the secretary will hold office hours at the Hotel Statler, Detroit.

On August 19 and 20 the executive committee and the committee on reorganization will be in session at the Hotel Statler, Detroit.

A FINAL APPEAL

This is the last opportunity we shall have to appeal to the loyalty of the members of the A. V. M. A. and others of the profession to attend the meeting of the association at Detroit, beginning August 21.

Rates, as favorable as possible, have been obtained from the Trunk Line Association. This association grants a rate of "two cents per mile in each direction, going and returning via same route only; tickets to be sold and good going August 19 to 21, and returning to reach original starting point not later than August 29." When purchasing tickets, the reduced rate should be asked for. The hotel rates are moderate as compared with other cities, although one may spend as much as he pleases. If you have not yet made your hotel reservations, do so at once, as a very large number of conventions are booked for Detroit this summer and it is advisable to avoid any difficulty in getting located. Rooms may be reserved at any of the hotels mentioned in the June issue. If this is done you may dismiss the matter from your mind and rest assured that you will have comfortable quarters upon your arrival.

Splendid lake trips may be made from many points and it would be advisable for those so inclined to make arrangements with the various railroads via lake steamers and also reserve state rooms on the steamers in advance. Full information of these trips can usually be obtained from the excursion bureaus at the various railroad or steamship offices.

The local committee of arrangements reports that matters are progressing as satisfactorily as can be expected. They are overlooking nothing that will add to the comfort and entertainment of the visiting members and their wives and friends.

The efforts put forth to make this meeting a success are shown in the official program

The program speaks for itself. The officers and committees have given freely of their time and labor and now cooperation is required from the members of the association, by their presence at the meeting, to insure a complete success.

We are perhaps entering upon a new era in veterinary progress. This year nearly all of the veterinary colleges are presenting a four-year curriculum; army veterinary conditions will undoubtedly be improved, as the result of favorable legislation; our country has been freed from the ravages of foot-and-mouth

disease. This should be a thanksgiving meeting. Show your appreciation by attending, and remember in this connection that your wife has earned a vacation and this is an unusually good opportunity to reimburse her, in part, for the assistance she has rendered you. A more ideal place than Detroit could not have been selected. The association expects every member to do his duty.

A WORTHY TRIBUTE TO A WORTHY MAN

On June 20 there was unveiled a tablet to the memory of Dr. Leonard Pearson, formerly a professor in the veterinary school, at the University of Pennsylvania, and dean of its faculty. The exercises were held in the library of the veterinary school. Dr. L. A. Klein, the present dean, spoke on "Leonard Pearson—His Work for Education for the State and for the Nation". William H. Caldwell, secretary of the American Guernsey Cattle Club, spoke on "Leonard Pearson—His Interest in the Farmer and His Problems". Dr. C. J. Marshall, state veterinarian, spoke on "Leonard Pearson—The Man". The tablet was presented on behalf of the Guernsey Breeders' Association by Dr. E. T. Gill and accepted on behalf of the university by Provost Edgar F. Smith. The tablet, which is erected in the archway of the veterinary building, is inscribed as follows: "To the memory of Leonard Pearson. B.S., V.M.D., M.D., Eminent as a Veterinarian, Scholar, and Lover of Mankind, through whose breadth of vision and untiring efforts these buildings were made possible; whose appreciation of the needs of Animal Husbandry kept him in sympathetic touch with the farmer, and whose achievements will always be an honor to his Alma Mater, this tablet is affectionally dedicated by the

GUERNSEY BREEDERS' ASSOCIATION."

The addresses gave eloquent testimony to the broad scope and value of the work accomplished by Dr. Pearson; to his modest demeanor and sterling character.

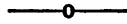
Dr. Pearson possessed unusual ability which was developed by extensive educational application at home and abroad. He was the first to apply the tuberculin test to cattle in this country and his researches, in the great bovine scourge, were those of a master. He has been secretary and president of our A. V. M. A. Aside from his great technical knowledge he was a man among men. His foresight, sound judgment and industry naturally compelled suc-

cess. The University of Pennsylvania has reason to be proud of him.

It was the writer's privilege to know Dr. Pearson, in his pre-veterinary days while he was working out his university course. No one appreciated more than he the importance of educational training and the value it has in fostering and developing natural talent. We are not surprised at the eminence he attained; knowing some of his earlier characteristics, we do not see how it could have been otherwise.

The tablet is a worthy tribute to Dr. Pearson. It indicates the esteem in which he is held by others than those in the veterinary profession. It will perpetuate his memory and his worth, and yet there is a tinge of regret:—that his fellow-veterinarians could not have been represented in this token of merit.

P. A. F.



APPOINTMENT OF COMMITTEE ON LIVESTOCK SANITARY AFFAIRS

The Secretary of Agriculture has appointed the following named members of the Bureau of Animal Industry as an advisory committee on Live Stock Sanitary Affairs:

- Dr. A. D. Melvin, Chief of the Bureau of Animal Industry, Chairman,
- Mr. Geo. M. Rommell, Chief, Animal Husbandry Division, Bureau of Animal Industry,
- Mr. B. H. Rawl, Chief, Dairy Division, Bureau of Animal Industry,
- Dr. R. A. Ramsay, Chief, Field Inspection Division, Bureau of Animal Industry.
- Dr. R. W. Hickman, Chief, Quarantine Division, Bureau of Animal Industry.

The committee will act in an advisory capacity on all live stock sanitary questions and will consider such matters as may be referred to it by the chairman or by the Secretary. Also on its own initiative it will consider related questions, suggest means for the control and eradication of animal diseases, and recommend such measures as seem best suited for live stock sanitary control work and for the general welfare of the animal industry.

EUROPEAN CHRONICLES

Bois Jerome.

POLYVALENT SERUM AGAIN. In my duties as chronicler, I have to avoid all appearance of favoritism and as much as possible must present to those who do me the honor of reading my communications, the various aspects under which the subjects I consider are related by others.

Such is the necessity and the opportunity that present themselves from the proceedings of a meeting at the Societe de Chirurgie, where the treatment of fistulous osteitis by the polyvalent serum of Leclainche and Vallee was under consideration.

Having recorded in other chronicles the great advantages that were claimed for it by veterinarians and human surgeons, I extract from a report made before said society on this subject.

First, the reporter refers to the utility of the serum, which is obtained from horses, immunized against the aerobic and anaerobic germs of many suppurations: staphylococci, streptococci, coli bacilli, pyocyanic, perfringens, septic vibrios, etc., and he then examines the effects of the polyvalent which when applied to infected wounds, change them, dry them and then promote cicatrization.

The technic of its application is considered and well known and I pass to the important part, the consideration of the report, which constitutes the "reversed side of the medal," presented from the successful trials recorded.

In another communication made some time previous, 282 old wounds out of 421 were reported as having recovered in three months and a half. Investigation of these cases showed that a certain number presented had only superficial lesions, and the cicatrix had reopened. Again a larger number was found in which, after a short time, the old wound was suppurating freely, with fetid discharge, sloughing of the walls of the fistulous tracts, sequestrum of bones and even foreign bodies.

Therefore, if small necrotic parts may slough out readily, it is not demonstrated that merely by the local action of a drain, moist with serum, a larger one might not. On that account, the reporter explains the frequency of complications such as lymphangitis, sloughing of the skin; etc., that he has observed.

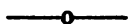
Not only these conditions have been observed but others more serious have followed the use of the polyvalent serum, such as suppurative arthritis, osteomyelitis, septicemic manifestations, etc.

Is it possible, continues the reporter, to explain these accidents, some of which are slight and others severe and even fatal, as being the result of a defective application of the serum? It is possible, but they exist nevertheless and must be considered, and as a conclusion he (the reporter) would not be inclined to immunize wounds with a serum which, directly or indirectly, renders the pyogenic microbes able to promote abscesses, sometimes severe, around foreign bodies encysted for months.

One of the members present at the meeting made the remark that "we know nothing of this new polyvalent serum, recommended in practice without its action having been demonstrated by conclusive experimental researches."

This severe statement should have been unnecessary if it is remembered that the two veterinarians who discovered the said serum are sufficiently known to prove that all the experimental researches necessary and their conclusions tested have been made.

At any rate, one of the critics of the polyvalent serum and one who was most severe and unwilling to accept its value, in a subsequent meeting withdrew all objections and acknowledged that the "serum was a marvellous preventive agent and was especially to be recommended in the prophylaxis of gaseous gangrene." A good recommendation for the polyvalent serum of Leclainche and Vallee.



LIGATURE OF BLOOD VESSELS IN FOOT DISEASES. This surgical interference may not, strictly speaking, be new. In the abstracts of the *American Veterinary Review* I have already recorded some of their applications in some foot affections. In the report that I read in the *Recueil de Paris*, by Army Veterinary Major J. Descazeaux, I find it of sufficient importance to warrant consideration.

Indeed the report refers to ligature of the phalangeal veins in the treatment of chronic laminitis and of contracted heels, which he says he has seen resorted to in some foot affections while he was in Brazil.

Chronic laminitis is the principal trouble in which he has used this treatment. Common in some regions, severe by its frequency and the accidents that accompany it, the loss of the services of the animal it occasions, the pecuniary depression, etc., all these conditions were favorable for experimentation and to determine what benefit might be gained by the method.

The treatment consisted in the ligature of one or of both phalangeal veins of the legs affected with chronic laminitis. It is an operation which has no bad sequelae and can be performed without fear. The preparatory steps are similar to those for neurotomy or for the ligature of the artery.

The animal having been cast, the hair is clipped, and the region disinfected. An incision is made on one or the other side of the fetlock, the vein is easily recognized, exposed, raised with aseptic silk thread and ligated. Once the ligature is applied, the central end of the vein may or may not be divided. If it is, the object is to avoid the formation of clots in that portion of the blood vessel. As a third step of the operation, the skin is sewed and a light dressing applied. Cicatrization follows rapidly, even if the skin has not been sutured. As mentioned this operation is the general technic of neurotomy or arteriotomy.

According to Mr. Descazeaux, the changes that take place in the operated foot are very interesting. They are more marked when both veins have been ligated.

"The day after the operation, the fetlock and coronet are swollen. Walking is more difficult. After a few days, this condition improves, the swelling has disappeared and locomotion is much easier. On the eighth day the foot is quite warm and the coronary band abnormally swollen. After the 15th day this condition is still more marked. The coronary band being quite large, the frog becomes very large, hypertrophied, elastic and soft. The rings of the wall, which were first juxtaposed, on a level with the coronary, gradually diminish, separate and extend downwards. The animal walks much easier, notwithstanding the contact of the soft frog on the hard ground. There is indeed a very marked improvement. On the 20th day, a broad, hollow shoe can be put on and the horse, moving much better and freely, can resume work."

This is a practical record which certainly will deserve attention. The author relates briefly the experiments he has made. There were eleven cases, where single or double ligatures were applied. All the cases recovered their general usefulness in a period of time varying between twenty and thirty days and these results speak much in favor of further trials.

While practising these experiments for the treatment of chronic laminitis, the author had the opportunity to try the operation in one case of contracted heels. With this case the results were

splendid. After 10 days the operated foot had a normal frog, rather hypertrophied and the movements of the animal were much improved.

In conclusion the writer says: "in chronic disease without alteration of the hoof, ligature of one vein will give a perfect improvement. In cases with alterations of the hoof the ligature of both veins is essential."

TREATMENT OF STERCORAL COLLECTIONS. Intestinal obstructions are often due to the agglomeration in the floating colon and the rectum of fecal matter, which form stercoral masses of various sizes and conditions and give rise to abdominal disturbances which in some instances become serious and even may end fatally.

These stercoral accumulations are, in some countries, quite common and animals of various ages, often the younger ones, are those which most commonly suffer, especially when the diet is of a special character.

The symptomatic manifestations observed, are similar to those of all intestinal obstructions: appearing either insidiously or suddenly, slight and sometimes intermittent colics, frequently with more or less diarrhea first; there are evacuations of mucus or of elongated droppings, hard and coated, etc. There may be tympanitis, more or less developed. Sometimes there is a passage of one or several hard masses or balls and recovery is then spontaneous. But relapses are rather frequent.

The diagnosis of stercoral balls is the easiest to make among the great group of colics. The absence of defecation, the elongated hard coated droppings, the rectal exploration and possibly the feeling of a hard body by palpation of the abdominal walls.

The prognosis may be serious, although in some cases recovery is quite frequent and yet by the classical treatment the mortality of a third or even half of the animals affected is not uncommon.

These remarks briefly taken from an article in the *Recueil of Alfort* by Mr. C. Bellu were made by him to suggest a method of treatment which he has used for years and which is considered as the proper curative indication. It consists simply in *large forced enemias*.

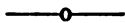
The large lavement, which in human medicine is the basis of intestinal washing has also found its application with animals and there are several instances where the use of large lavements have

been beneficial. In the present instance, the principle of the treatment is the dilution of the stercoral balls under a constant pressure of water, sufficient to soften, to dislocate their structure but yet insufficient to rupture the intestines. The pressure must be kept up until the liquid runs very easily in the large intestine and remains in it a sufficient length of time to produce the disintegration of the fibrous structure of the balls by its peristaltic contractions.

To realize this condition a rubber tube is necessary, 18 to 25 millimeters in diameter, two meters in length. This is to be connected with any kind of container, to hold about 30 litres of liquid, and provided with a cork at its bottom. The animal is cast, or if quiet enough only hobbled behind, a tobacco bag suture is made at four points through the thickness of the anus, the rubber tube is inserted and the liquid poured in the container and allowed to flow slowly and gradually through the intestines where its softening action upon the stercorous mass takes place more or less rapidly. In many cases one injection is sufficient, but sometimes it has to be repeated for three or four days until the feces are once more normal. The quantity of fluid injected varies according to the age and size of the animal, and while yearlings may be relieved with about 8 to 12 litres of liquid, animals of two years or more may require as much as 40. Indeed in adult animals 60 and 70 litres of water have been used. But such quantities are unnecessary.

When the operation is finished and the rubber tube is removed, the tobacco suture which was first only tight enough to prevent the tube from coming out is then closed tightly for a few hours so as to allow a more thorough dilution and dissociation, generally three hours are sufficient to permit its removal and justify the complement of the treatment by the subcutaneous injection of eserine.

No after care is necessary, no complication to be looked for and the treatment is said to be the one of choice for stercoral balls and egagropiles. It is sufficiently simple to justify its trial.



OPSONIC METHOD IN SURGERY. In previous chronicles I have in the JOURNAL placed before our readers the subject of pyoculture and of the opsonic index with the controversy and opposition the former had found among some surgeons of high repute. The analysis of an article of the *Archives de Medecine Experimentale and Anatomie Pathologique* that I find in the *Presse Medicale* permits me to bring the subject again before those who may have some

interest in it. Certainly the considerations of the authors are very valuable and deserve attention.

When one follows the sequelae of operations in a large number of patients, he readily notices the infectious accidents which occur in some, notwithstanding the difficulties and the long duration of the surgical interference, recovery takes place without any trouble, while in others the simplest and best regulated operation is at times complicated with most disastrous consequences.

Must it be admitted that in those cases the infection takes place through the instruments or the hands of the surgeon? Of course, that is possible, but the occurrence is exceptional, especially in our day, with perfect sterilizing apparatus and thoroughly educated practitioners.

Most often the infection of a wound takes place at the time of the operation, by the germs of the surrounding air. It is an infection that must necessarily take place in all the cases.

In general, as these germs are readily destroyed in an organism in possession of lightly developed phagocytic properties, it is only when the resistance of the patient is weak that they can give rise to the series of post operative infectious accidents.

Can this resistance of the patient to the infection be learned beforehand and then estimate the possibility of such infectious accidents after an operation, be entertained?

The authors of the article say that by the opsonic method the problem can be satisfactorily solved.

From the careful consideration of a large number of operations when they have resorted to the method (which they made only with streptococci) they have observed that there exists a close connection between the value of the opsonic index and the resistance to the infection. This may be said to never take place when the opsonic index is above normal or even slightly below, at 0,90 for instance. Between 0,90 and 0,75 infection is frequent, but not sure and if it occurs, it assumes relatively serious characters. Below 0,75 infectious accidents were always observed.

Is the value of the opsonic index always identical in the same individual, whatever may be the variety of microbes examined or are there distinct variations? By preventive vaccinations, can the value of the opsonic index be elevated in a patient before an operation? These are questions of importance which are now the object of investigation by the authors and while awaiting the results of

their labor it is satisfactory to know their practical conclusions, namely: in all patients having a very low opsonic index great attention is required and the duration of a serious interference must be reduced and even avoided if possible.

BIBLIOGRAPHIC ACKNOWLEDGEMENTS. I hope I am not intruding on the kindness of our worthy editor with the following thankfully received publications from various parts of the States and which if they continue to come I will take advantage of for future chronicles.

Chicago Veterinary College Quarterly Bulletin, Dec 1915; *Cornell Veterinarian*, April 1916; *Alpha Psi Quarterly* March 1916; *Reprints from the Journal of Agricultural Research*, January, February, March, April 1916; *Suggestions for the Repression of Sterility, Abortion and Mammitis in Cows and of White Scours in Calves*, second edition, circular No. 4, N. Y. S. Veterinary College, Cornell University, by Prof. W. L. Williams.

A. LIAUTARD.

CORRECTION. Doctor H. S. Murphey calls attention to corrections which should be made in the proceedings. The corrections are indicated by the words in the parentheses. In the June number, page 430, the paragraph should read: "I wish to say that we went to no little trouble to collect the local data for the material (of this report) and so far as the usefulness of (the speaker to this) committee is concerned we feel that it is at an end, etc." In the July number on page 556, Dr. Murphey should have been credited with saying the *budget* system instead of the Babson system.

In the past five years the quantity of meat and meat food products prepared under Federal supervision has averaged slightly over 7,000,000,000 pounds yearly (about 70 pounds per capita of population of the United States). About 19,000,000 pounds of this (one-fourth of 1 per cent) were condemned.

A report recently issued by the Census Bureau shows that 558,000 carriages were manufactured in 1914, which is nearly 34 per cent less than in 1909. The number of wagons was 573,000, which is 9 per cent fewer than in 1909. These reductions manifestly reflect the effect of the automobile,

HALTING OR LAMENESS IN THE HORSE*

(Boiterie ou Claudication du Cheval)

F. T. DAUBIGNY, Montreal, Can.

The act of halting is an irregularity in the gait of the animal caused by an inequality or inability of one or more legs to perform their normal functions; the lameness is shown by certain positions or movements which the animal is forced to make in order to reduce or prevent pain. Lameness is not a disease but a symptom of some disease existing at some point in the leg where action is abnormal.

Lameness may be caused by a great number of pathological changes or accidents, among which the most common are lesions which hinder the movement of joints, e. g., ankylosis, sprains and luxations. Sometimes we find an alteration in the length of a leg or a change in its direction; frequently the lesions interfere with the action of the different muscles (springs), thus wounds, ulcers, contusions. Lameness often arises from atrophy or paralysis of a portion of the leg, very often from some unknown pain which one supposes to be rheumatic.

The degrees of lameness vary greatly in intensity. We have borrowed terms from the veterinarians to express these differences, as the animal "feigns" when the lameness is hardly noticeable, or that the animal limps when he is very lame but does not prevent him from putting weight on all four feet; that he walks on three feet when the pain is so sharp that the animal puts no weight, or extremely little, on the affected foot.

An animal may not limp in walking but does so when trotting. This is explained by the fact that in trotting the weight of the body is carried alternately on each pair of diagonal legs; the weight being therefore double that carried by each leg while walking. The specific symptoms of a lameness depend entirely on its nature and seat; prognosis and treatment are entirely dependent on the exact diagnosis of the lameness.

The question of diagnosing a lameness is threefold: 1. The determination of the lame leg; 2. The determination of the seat of lameness; 3. The determination of the nature of the lameness.

1. Determination of the lame leg. The horse is examined first at rest; then during exercise; finally after exercise. General

*Presented at the meeting of the A. V. M. A. Section on Practice, Oakland, Cal., September, 1915.

ly the lame leg is exempted from supporting the body during rest in proportion to the intensity of the pain; if the lame leg is a foreleg it is held forward and we say the animal points; sometimes the leg is stretched; at other times it is half flexed at the fetlock or knee. Occasionally the leg is completely relaxed and rests on the anterior surface of the hoof. If the animal limps in a hind leg he holds it half flexed and supports it on the toe, or carries it slightly in abduction resting on the internal quarter of the hoof, or he may hold the leg up, or finally allow it to relax completely. While the affected leg is relieved of the support of the body, the other legs are placed under the center of gravity in such a way as to receive the weight of which the affected leg has been relieved. If two legs are affected at the same time the animal will relieve them alternately; the pressure being always less continuous on the affected leg. If the two forelegs are affected the animal will bring the hindlegs as far forward as possible and hold his head up; he lowers his head and places the forefeet under the center of gravity if the two hindlegs are painful; if the pain causing the lameness is very severe and sharp one can recognize the fact not only by the position of the animal but by movements denoting lancing pain by which the whole aspect is changed.

The best way of examining a horse during exercise is to have him led in a straight line when trotting, which should be done on hard ground. The assistant should lead the animal loosely so that his head is free at all times; the observer places himself so that he may examine the horse from in front, from behind and from the sides, his attention must be fixed alternately on the forelegs, hindlegs and diagonal pair of legs. The walk is insufficient for a diagnosis, and the gallop may lead one into error. Sometimes one must turn the horse around on himself, by which means the pressure exerted on the inner legs may reveal a lameness which remained obscure during the exercises in a straight line. Sometimes it is advisable to have the animal walk on an inclined plane; the weight of the body which falls on the anterior parts during the descent will often make a lameness more noticeable.

In certain special cases it is better to have the animal exercised on soft ground where he will be forced to greater exertion. The habit of riding an animal is vicious and leads to many mistakes. The animal must be free from any covering.

The animal when examined while walking bears the least possi-

ble weight on the affected leg and presses upon it as little as possible. This leg makes its rise the quickest, it carries the foot the longest, places it down last and bears weight on it for as short a time as possible. On the other hand the corresponding leg carries the weight the longest and has the other periods as short as possible in order to come promptly to the assistance of the affected leg.

If the pain is slight and is found in one of the forelegs the head is raised at the moment of placing the affected leg on the ground and throws the weight on the opposite diagonal leg. If the pain is very severe in one of the fore legs the animal holds that foot up, places the weight on the hind legs; he will then rise up and hop on the sound fore foot. If the pain be in one of the hind legs the head is lowered when that leg is placed on the ground, the weight of the body is thrown as far forward as possible, the other hind limb quickens its return to the ground so as to lengthen the time weight rests on it. The use of the affected leg is always accompanied by a lowering of the croup so that the leg will not have to bear its share of the body weight; when the sound leg is placed on the ground, the croup is raised. By this means the horse puts its weight on the well side. It is most important to observe the movements of the head and croup while walking the animal. Irregularities of gait in a lame horse are noticeable not only to the eye but also to the ear; the application of the sound leg to the ground is stronger more sonorous.

Lameness of a diagonal pair of legs is characterized by a combination of the symptoms seen in fore and hind leg lameness, but they are aggravated because of the greater difficulty in progression.

2. To find the seat of lameness: this part of the problem is more important and usually more difficult than the first and is combined with it. We solve this question by examining the lame leg at rest and during exercise; here the veterinarian may avail himself of several helps to diagnosis, one of the most important being to obtain an accurate history of the case. He must know how long the lameness has been apparent; what was the probable cause; he must ask whether it followed shoeing, a fall, a blow, shock, slip, etc.; whether it is more apparent at one time than at another.

Another method is the direct examination which will often furnish positive symptoms, whether it is only the application of the hand over the part, or by other means of examination, as moving the articulations in certain ways, or by comparing the region with

the corresponding region on the opposite sound leg; one often finds a change in the shape, volume, direction or in the continuity of the part; or other modifications in the sensibility, consistence, or temperature of the part. One can sometimes observe a symptom which is characteristic of disease of a definite region, by the way the leg is held while at rest; if while pointing the weight is borne on the whole sole, the pain is not in the hoof but is frequently in the shoulder; if the pain is caused by a contusion or articular disease the weight will be supported on the toe. A painful fetlock indicates some lesion of the tendons or patellar region. A dropping of the shoulder and supporting the leg on the anterior surface of the hoof indicates a disease of the muscles in the olecranon region.

In the hind leg the fact of having the foot raised indicates pain in the hoof; holding the leg in abduction is a symptom of pain in the hock.

The examination of the veins and especially of the arteries often shows the seat of an incipient lameness. This examination is made in the fore leg on the interior surface of the cannon, in the hind legs just below the heads of the small metatarsal bones. This method may often reveal the presence of nail punctures, detachments of the sole or wall, contusions or even torsion of the fetlock.

Slight symptoms during exercise are sometimes of diagnostic importance, as for example, in sprains of the fetlock, one sees a characteristic oscillation of this region, an uncertainty accompanied by pain when the foot is placed on the ground. In luxation of the patella the leg is dragged during progression and the anterior surface of the hoof and phalanges rub on the ground; there is a loss in the action of the extensor muscles of the leg. In flexing the hock or knee the animal does not show the difficulty to which he is put, as shown by the circle which the leg describes, usually outwards. Rupture or paralysis of the olecranon muscles is accompanied by relaxation of the fore leg, rupture of the tendon of the flexor metatarsi (tibial pre-metatarsal), founder. Certain fractures show certain characteristic symptoms during progression which are sufficient to make a diagnosis.

One frequently observes that pain in the upper part of a leg immobilizes that leg to a certain extent, but there is no general or conclusive evidence of its being a rule. An animal which one has been led to believe is lame in the shoulder, proves to have a pain in

the hoof. In the same way the act of mowing, that is, of describing circles outwards while walking, the movement originating in the upper part of the leg was supposed to indicate disease of the shoulder. One finds, however, that it also occurs in cases of pain in the olecranon region, or beneath the shoulder. The same is the case for the hind legs.

Many a horse has been treated for hip lameness that had a lame fetlock; it is often necessary to have the animal walk slowly and to notice alternately the action of each joint, and to compare it with the sound leg, trying to find some difference.

To find whether the animal is lame in the foot or in some other region, it has been proposed to have the animal walk on a thick dung heap; the halting diminishes or disappears when it comes from the foot, persists or is aggravated when from some other cause.

If one makes the animal travel down hill the pain is increased if it is in the foot; it is decreased if in the shoulder; on uneven ground one notices frequent stumbling in horses that have a phalangeal sprain.

One must look to the hoof especially in lameness of the fore legs. The hock is most frequently the seat of pain in the hind legs. An important point in removing the shoe from a lame foot is to remove each nail after its rivet has been cut, so as to prevent shocks which are always painful.

Whatever one knows of the injured spot he should thin the sole till it gives at all points under the thumb. One examines it all over especially at the juncture of the sole with the frog which is the most dangerous part.

There are frequent cases in practice where one is unable to find the seat of lameness, and is forced to adopt conjectures, to say that there is rheumatism, or an incipient spavin. In such cases it is advisable to make use of cocainization, beginning with the foot and working up to the shoulder.

3. To determine the nature of a lameness. This is closely related in most cases to the finding of the seat of lameness. The seat once found the nature of the disease is at once apparent. Certain lamenesses which are purely nervous or rheumatic, have no true seat, at other times they have variable seats. There are some lamenesses that are symptoms of other diseases, such as glanders, farcy, purulent infections. These lamenesses are frequently due to arteritis or more commonly to fibrin clots especially in the femoral artery.

The causes of lameness are very numerous and varied. Sometimes lameness is due to malformations, shortening of the leg, lack in development, crooked legs, etc. These are inherent to the individual. External causes as shocks, blows, slips, nail punctures or shoeing may be a direct cause; certain services which we demand from the animal; bad roads; rains and drought may be causes of lameness.

[Editor's note: This article was submitted in French and was translated by Dr. J. P. Scott.]

LAMENESS AND ITS MOST COMMON CAUSE

JAMES McDONOUGH, Montclair, N. J.

Having devoted forty years of my life to the study of lameness and its cause, I beg the indulgence of the members of my profession while saying a few words about a condition, that in my opinion, is the most common cause of lameness in the horse.

I do not refer to my long period of study as proof that my opinion should be accepted, or even seriously considered, but as an apology for asking that it be read and considered by those better qualified to pass upon this subject.

Lameness is caused by the presence of a condition that renders some part of the limb unable to perform its work with comfort; it may be a departure from a healthy condition, or the overtaxation of a healthy part. Of course, there are causes which are constitutional, but, by far, the most common causes are local, and the direct result of an injury to that part of the limb.

This leads up to the cause of injury, which I will attempt to simplify by excluding accidents, and will refer only to those caused by the animal's efforts to perform ordinary work.

When the injury is severe or persistent, its location can usually be determined by the presence of some abnormal condition—as exostosis, or heat and swelling of the soft tissue.

When we have proof of its location, we find that it is usually located upon the side of the limb, and must be caused by the presence of some condition that increases the work of the limb at that place.

When the work of but a part of the limb has been increased it becomes evident that the relation of the parts to each other has been changed, and as the relation of the parts to one another is dependent upon the support furnished by the base or foundation upon which the limb rests, we must look to the hoof for the cause.



FIG. I.

All columns, placed in a vertical position and supporting weight are provided with a base or pedestal of sufficient size and of proper shape to insure their stability.

If the equilibrium of the column will be preserved, the base must rest upon a surface with a diameter equal to that of the base. If a horse's hoof—the base of the limb—rests upon a surface as shown in Fig. I, it will give to the limb all the support that it is possible for it to receive from a base of that size and shape. If rested upon three little piers, as shown in Fig. II, it is evident that

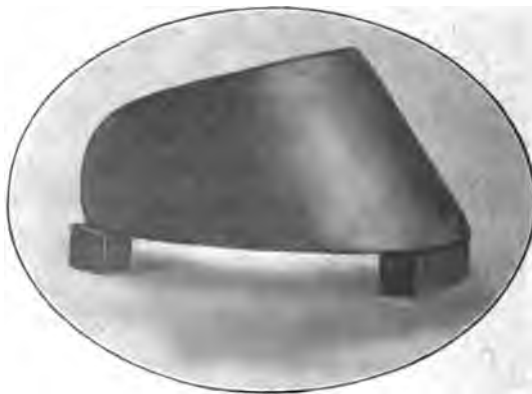


FIG. II.

there is nothing to support the limb at either side. As this is sure to result in injury to the limb, something must be done to correct it, for there is no one who would think of using a horse with his four feet resting in this position.



FIG. III.

We will first attempt to correct this condition by attaching to the bottom of the hoof a flat piece of iron (a shoe). If we now rest the shoe upon the piers, as shown in Fig. III, we find that it will rotate with the hoof, as it is a part of it.



FIG. IV.

We will now attach the shoe to the little piers and we have a three-calked shoe; but we again fail to change the condition as the

calks also now become a part of the base and move with it. The relation of the hoof to its supporting surface when it first rested upon the piers has not been changed in the least, as it is now just as easy for the calks to rotate upon the surface below as it was for the hoof to rotate upon the calks. See Fig. IV.

Our very apparent failure to support the limb by the use of three calks suggests the use of more calks, so we will place one under either side (Fig. V) and the stability of the hoof and comfort of the limb is now assured.

All of our previous efforts to accomplish this seem like kindergarten exercises, as the placing of a support under either side would be the first thought of any six-year-old child of average in-

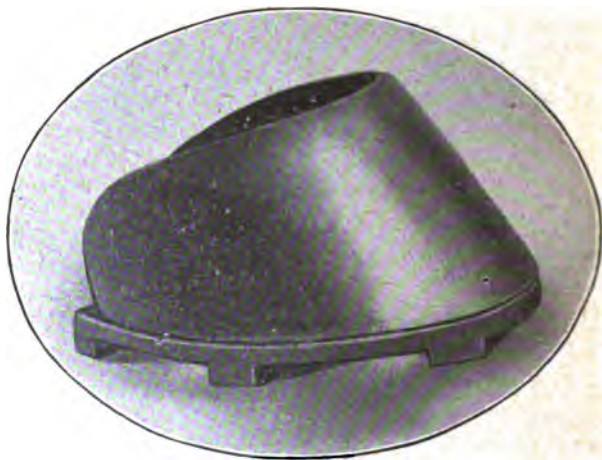


FIG. V.

telligence. But as ridiculous as it may appear, the undeniable and indisputable fact remains that for hundreds of years horses have been compelled to travel and work with all four feet resting upon three little piers, whose shape, position and relation to the bottom of the hoof are identical with the condition shown in Fig. II.

And we of this Twentieth Century continue to do this in the presence of the most convincing proof of its injurious effects seen upon the limbs of every horse that has performed six months of any kind of service, while shod with three-calked shoes. For some unknown reason we think that that part of the shoe extending past the calks at either side gives support to the hoof at that place, and these simple illustrations are given to make plain that it is impossible for any part of the shoe, extending past its point of contact

with the ground, to give the slightest support to that part of the hoof resting upon it.

Before making any part of a machine intended to perform a certain work, we will first determine the amount of power necessary for its performance and then make all parts strong enough to stand the strain to which it is possible for a machine of that power to subject them. If the many parts of the machine are properly constructed, and carefully adjusted, they cannot be injured by the work possible for a machine of that power to subject them. If the work exceeds the power of the machine, it simply stops without injury to itself.

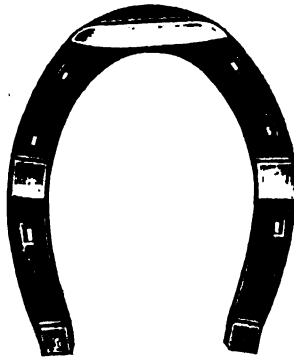


FIG. VI.

So it is with the horse. While its limbs remain in their normal position it is impossible for him to be injured by any amount of power of which the animal is capable. And for this reason any injury to the limb, barring accidents, can be accepted as proof that the adjustment of the limb has been disturbed, for we cannot question its construction, and the injuries will exist upon that part of the limb where the work has been increased.

As the displacement of the limb must be in the direction of that part of the limb where the injury occurs, the part or parts injured must occupy a position corresponding to the direction of the displacement.

I will here refer to a report made by a committee of veterinarians appointed by the New Jersey Veterinary Medical Association to examine the limbs of a number of horses. Upon the limbs of the one hundred and six horses examined, they found 428 perm-

anent injuries—(puffs not included). Of this number, 412 were situated upon the sides of the limbs. Twelve of the remaining sixteen were on the front of the knee and probably caused by the animals falling or striking the knees against the manger (accident).

One hundred and fifty-three of the 212 front limbs and 209 of the 212 hind limbs (the propelling levers of the body) were injured to the extent of rendering all of those animals less serviceable, and some unserviceable, at an average age of nine years, which should be the most serviceable period of the animal's life.

It will be seen by the above report that 412 of the 428 injuries were caused by the displacement of the limbs in the direction of their sides—the result of insufficient support at that place. Had the hoofs been given support at the quarters, there is no reason why the limbs of those animals would not remain sound, and continue serviceable during the life of the animals.

The old-fashioned calked shoes have been universally used for so long a time that it is no easy matter to convince ourselves that they are positively injurious to the limbs of our animals.

But the length of time they have been in use cannot possibly change their principle of support, and unless there is some one prepared to explain in what way it is possible for three-calked shoes to give support to the hoofs at either side, or show how it is possible for the limbs to perform their work, and escape injury, in the absence of support under either side, we should take some action that will cause the discontinuance of this diabolical and brutal practice.

If we will do this, it will add 100% to the value of horses by doubling their present period of usefulness, and relieve them of the sufferings we have so long compelled him to endure in silence.

Will someone give just one reason why shoes having but three calks should ever be used or will anyone offer a single objection to the use of two additional calks?

Dr. P. H. Egan, who has spent the winter in Iowa and East St. Louis, Ill. examining, immunizing and supervising the shipment of horses for the war in Italy, has located at Nashville, Tenn., 422 Fourth Ave., N.

GLANDERS IN WILD ANIMALS KEPT IN ZOOLOGICAL GARDENS

GEORGE H. HART, V.M.D., M.D., Los Angeles, California.

In the city of Los Angeles, and close to its borders, there are probably a larger number of wild animals kept in captivity than in any other city in the country. These are owned by the moving picture companies, by circuses wintering here, and by the city.

One motion picture company has 800 head of wild animals connected with its picture studios, being the largest collection of privately owned wild animals in the world.

The alligator farm, a place of great interest to tourists, maintains 500 head of alligators.

The city, in its large 3000-acre Griffith Park, with its rugged, mountainous topography, has an ideal location for the keeping of a zoo under natural conditions.

In all there are five collections of animals here permanently, and one or two added to these during the winter season, making a total of from 1500 to 2000 head.

Within the past few years two serious outbreaks of glanders have occurred among these animals, the first one being in a picture company's animals, and the second one in the animals owned by the city of Los Angeles.

SOURCE OF INFECTION. With so many animals to feed and care for, the question of a sufficient and economical food supply is one of importance. As a great many of the animals are carnivorous, meat constitutes one of the main items of diet.

On account of the fact that equine flesh can be secured at a very great saving as compared with bovine flesh, the former has been used exclusively for the meat supply of these animals.

The horse slaughter houses have been conducted by laymen with absolutely no supervision.

The horses have been purchased from horse traders, peddlers, etc., the animals being usually old or crippled, and in such condition that they are no longer of any value for work. These horses bring from \$2.50 to \$10.00 a head.

It can readily be understood, however, that among this class of horses the incidence of glanders is the highest. Therefore, in a community where glanders is more or less prevalent as it is in

Southern California, such horse flesh feeding can only be done with any degree of safety under the strictest supervision by qualified veterinarians. The feeding of horse flesh killed without any such supervision has been the cause of both outbreaks of the disease.

HISTORY OF THE OUTBREAK. The first outbreak occurred three years ago, entailing an animal loss of 14 lions and an economical loss of approximately \$20,000.00, some of the lions being especially trained for moving picture work.

The recent outbreak in the City Zoo appeared in November, 1915. The first animal to show the disease was a Russian wolf, which broke out with sores on its body, and was destroyed by the attendants without the true nature of the trouble being suspected. Shortly following the death of the wolf a lioness became affected, and an animal man was called in, who diagnosed the case as an abscess of the head, from which supposed infection she finally succumbed, and no post-mortem examination was made.

The next animal to be affected was one of the finest specimens of male lions in captivity. The animal was valued at \$2,000.00, and it was with him as a model that the lion statues at the Panama Pacific Exposition were made.

This being such a valuable and docile animal, a great deal of treatment and nursing was given him, but he died early in January, 1916; and still the true nature of the disease was not ascertained.

This animal's death, however, was rapidly followed by two other lions and three leopards coming down with the same ailment, and then a more careful investigation was decided on by the City Park authorities. This investigation was done by Dr. L. M. Hurt, County Livestock Inspector of Los Angeles County, Dr. R. T. Whitteley, and the writer.

SYMPTOMS. The symptoms in these animals in several cases began with lameness, due probably to enlarged lymphatic glands. This was followed by lack of activity and customary life in the animal, and almost complete loss of appetite, with resulting rapid emaciation. From this point on, the disease assumed two distinctive forms, one being the nasal glanders and the other farcy.

In the nasal cases there was noticed a mucous discharge which soon became streaked with blood. The animal would snuffle as though it had difficulty in breathing through its nose. The blood streaked mucus became more pronounced with a particular increase in the amount of blood, until at times hemorrhages would occur

from the nose. The extension of the inflammation to the conjunctival mucous membrane in some cases occurred late in the disease, and blood streaked mucus flowed profusely from the inner canthus of one or both eyes.

The emaciation progressed rapidly, and these animals died in the course of two or three weeks from the time the symptoms appeared.

In the farcy cases the nodules were not easily visible on account of the long hair, until after they had broken, when they appeared as deep ragged ulcers, with no tendency to heal. They formed on the inside of the legs and along the abdomen, and in one leopard just behind the ear. The general condition of the animals with this form of the disease did not decline so rapidly as with the nasal form, and both animals showing farcy were destroyed before the disease had run its course.

DIAGNOSIS. The positive diagnosis of the disease is more difficult than in domestic equine animals, because they do not respond to the ordinary tests so readily. The history is very important, and when a number of the carnivorous animals are showing any of the above symptoms, with a history of having been fed horse meat, glanders should at once be suspected.

The ophthalmo-mallein test in these cases, as well as in the outbreak of three years ago, gave inconclusive results. Two lions and one leopard affected with the disease were tested. One lion showed a lachrimation with no pus formation, while the other two showed absolutely negative results. This is probably to be accounted for by the fact that the infection was so overwhelming and advanced that the animal organism could not respond to the biological test as is frequently seen with the tuberculin test in cattle with advanced cases of tuberculosis.

Four male guinea pigs were inoculated intra-abdominally with discharge taken from the nasal cavities, and two with secretions from the farcy ulcers. Four of these experimental animals died before sufficient time had elapsed for the orchitis to develop. The remaining two, however, lived for 72 hours and showed no inflammation of the testicles. This tended to confuse the diagnosis, and more guinea pigs were injected. In all, twelve male guinea pigs were inoculated and the typical orchitis was obtained in two of these animals. These were inoculated with an emulsion of a very much enlarged and congested posterior pharyngeal gland obtained on post-

mortem examination of one of the animals. This reaction confirmed the clinical diagnosis of glanders.

Blood was drawn from two of the animals and forwarded to the Bureau of Animal Industry at Washington for the complement fixation test. These samples never reached the Washington laboratory, and it is supposed they were in some mail bag lost during the January floods. This test, where available, is probably the most satisfactory means of establishing a diagnosis.

POST-MORTEM EXAMINATIONS. The carcasses of the animals dying from the disease were emaciated, with marked edema of the subcutaneous tissues. The lymphatics throughout the body showed evidence of a severe infection, with enlargement of the glands and choked condition of the lymphatic vessels.

The characteristic glanders nodules in the lungs were absent, probably due to the acute nature of the infection, terminating fatally in so short a time.

The farcy ulcers were very deep, with irregular edges and choked lymphatics leading from them.

The most typical glanders lesions were found in the nostrils of the nasal cases. Here the entire mucous membrane covering the nostrils and turbinated bones was eroded into one large ulcerated area, with profuse blood streaked discharge.

TREATMENT. In this outbreak, as soon as the diagnosis was made, all affected animals were at once destroyed. It has been reported that feline animals have recovered from glanders, but in this case four had died before a positive diagnosis was made. Two of these had been given such careful treatment and nursing that it was not deemed advisable to risk the danger of infection of attendants and other animals by keeping visibly affected ones on the premises.

Since the sick animals, numbering four lions, three leopards, and one wolf have either died or been killed, and the premises disinfected, three months have elapsed and no new cases have developed the disease, and it is now hoped none of them are infected.

PREVENTION. The prevention of this disease is easily accomplished by not feeding horse flesh to these animals. If the number of animals is large, and horse flesh must be fed for economic reasons, then it should be accompanied by strict veterinary supervision.

The killing for the entire community should be done at one slaughtering establishment. This establishment should be equipped

with adequate cold storage equipment to chill and keep the meat a reasonable time. It is possible at times to purchase a considerable number of horses, and at others they are difficult to obtain. By having cold storage the supply and demand can be more readily regulated, the meat is in better condition, and the cost of feeding the horses on foot after purchase is eliminated.

The slaughtering establishment should also have separate and individual corrals or stables where incoming horses are kept until they are ascertained to be free from glanders; and then a general corral or stable to which they are removed while awaiting slaughter.

The veterinary inspection should consist of an ante-mortem examination with the application of the ophthalmo-mallein test or the complement fixation test, or both. A post-mortem examination should also be made as a further precautionary measure.

Under such restrictions I feel sure horse flesh could safely be fed to wild animals, and its great saving in cost over beef would amply justify the added expense in equipment and maintenance. These restrictions could be self-imposed by the companies having the wild animals to feed, and would not have to be under public supervision.

THE RELIABILITY OF CELL PROLIFERATIVE CHANGES IN THE DIAGNOSIS OF RABIES

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Essentially, the relative value of factors bearing upon the diagnosis of rabies can only be determined by careful comparison and confirmation of laboratory findings, one with the other, and of these with the clinical record in each case. Obviously, again, the value of our conclusions will depend upon the number and character of cases submitted. Primarily these factors fall under two heads,—those ante-mortem and those post-mortem. Prior to the year 1900 there was practically no method other than diagnostic inoculation for the confirmation, or otherwise, of conclusions drawn from ante-mortem observation.

Babes, in 1892, was first to utilize for purposes of diagnosis, certain cellular changes which had previously been observed in

the brain and cord of dead rabie animals. In 1900 Van Gehuchten and Nelis, working on subjects dead from rabies, announced their observation of atrophic cellular changes in the plexiform ganglion with proliferation and invasion of cells evidently from the capsule and lymph channels. In the same year Ravenel and McCarthy, by their investigations in the Laboratory of the State Livestock Sanitary Board, the first in this country to take up this method, further advanced the diagnostic importance of these tissue changes, establishing them as the most accurate and rapid means then at hand for the post-mortem diagnosis of rabies. The changes were found to be especially marked in the plexiform ganglion of the pneumogastric nerve and in the gasserion ganglion. Under normal conditions the nerve cells of these ganglia are held in a supporting tissue, each cell surrounded by a capsule consisting of a single layer of endothelial cells.

The alterations brought about by the rabie virus seem to involve the latter cells particularly, their abundant proliferation causing them to crowd upon and overlie the nerve cells which, at the same time, undergo a degeneration leading to their complete destruction. Exceptionally the process may be so far advanced and widespread as to involve the obliteration of all of the ganglion cells, the whole neural cellular structure giving place to the round cell invasion. In most cases a number of the nerve cells will be but slightly changed, while, again, the process may be confined to well defined areas.

As a quick and reliable means for the diagnosis of rabies, these findings were of much value in that, under ordinary conditions, the examination could be completed in from twenty-four to forty-eight hours after the death of the animal. In cases returned as positive by this method, treatment of persons bitten and the establishment of quarantine measures could be proceeded with at practically the initiation of the uncertain period of incubation, while heretofore such action, based upon positive laboratory findings, had to be delayed pending the result of diagnostic inoculations.

In 1903 Negri demonstrated the presence of certain bodies in rabie brain and ganglionic nerve cells which he claimed as protozoon and as the specific cause of the disease. As to the concomitance of these bodies with rabies, the findings of Negri have since been substantiated by investigators throughout the scientific

world. To most pathologists, however, the evidence has as yet been insufficient to verify his claim as to their organic identity, or that they are the specific causative agents of the disease. Upon these phases there is considerable contemporary investigation, and much has been written for and against Negri's conclusions.

Bodies *similar* to Negri bodies have been reported as having been found in the brains of animals, especially dogs, dead from other causes than rabies. Within the past year, with a view to securing some experimental data as to this, we asked the Hospital of the School of Veterinary Medicine, University of Pennsylvania, to send to the laboratory the brains and ganglia of dogs dead from causes known to be other than rabies. Thirty-three such specimens were submitted from each of which there were made smears and sections of the hippocampus major and cerebellum and sections from the ganglion nodosum (second ganglion of the pneumogastric; plexiform ganglion). *A thorough search of this material failed to reveal any intra- or extra-cellular structure that could be regarded as a Negri body, and in no case were there changes in the ganglia.* Our present unsatisfactory knowledge as to the nature and specificity of Negri bodies will not admit of denial that identical bodies may occur in the central nervous tissue of animals dead from other cause than rabies. That certain elements in smear preparations and extruded nucleoli within the nerve cells of sectioned material might, under certain circumstances be misleading, is certainly true. To trained and observing laboratory workers in this field, however, differentiation in such cases presents no great difficulty.

The definite morphological characteristics and staining affinities of Negri bodies, together with the fact that they have not been proven to exist in any other disease, make them so conclusively diagnostic that their detection in material submitted to the laboratory of the board suffices for an immediate positive report. If these bodies are not found after careful search of smear preparations from the hippocampus major and cerebellum, the material, together with the ganglion nodosum, is sectioned and stained according to Mann's method and with haematoxylin-eosin.

Ordinarily where no bodies are found after this treatment the case is reported as negative to laboratory findings indicative of rabies, a further test by inoculations being made if requested.

A conclusive laboratory diagnosis, however, is often beset with difficulties or found quite impossible, due to various hinder-

ing conditions of material submitted. Advanced decomposition or extreme mutilation in the destruction of the animal may be mentioned among these. Under such conditions it is necessary to refer a final opinion in the case to the following diagnostic factors, either singly or in relation to each other:

- 1st. History and clinical symptoms alone, or in relation with gross post-mortem findings.
- 2nd. Bodies of uncertain but suspicious nature in decomposed, contaminated, or otherwise unsatisfactory brain material, alone, or in relation with the first.
- 3d. Changes in the ganglion nodosum alone, in relation with the first, with second, or with both first and second.
- 4th. Diagnostic inoculations.

In many cases where the brain has been shot away, or from other causes is in unsatisfactory condition for examination, the ganglion nodosum is available, and on microscopic examination will show the distinctive changes if rabies be present. These may be fairly well marked even though the brain has undergone advanced decomposition with complete disintegration of the nerve cells. How dependable a diagnosis based upon examination of this ganglion alone may be, could only be determined by careful comparison of findings by this method with those of other methods in the same case throughout a long series.

With a view to investigation along this line, a series of observations have been carried out at the laboratory for a period covering the two years from April 1, 1914 to April 1, 1916. 453 brains and ganglia were examined, smears and sections being made from the hippocampus major and cerebellum, and sections from the ganglion in each case. The appended table summarizes our observations from this material:

- | | |
|--|-----|
| (a) Smears and sections positive, ganglia positive.. | 223 |
| (b) Smears and sections negative, ganglia negative.. | 187 |
| (c) Smears and sections positive, ganglia negative.. | 9 |
| (d) Smears and sections negative, ganglia positive.. | 34 |

Total brains and ganglia examined.....453

Considering series "a," "b," and "c," only, the discrepancy as between brain and ganglia approximates 2.2%. In series "d" much of the brain material was not in condition for satisfactory examination, which, in such instances, may account for the negative findings, while in other cases it is quite possible that changes may have been so scant and obscure as to have escaped observation. Furthermore, brain preparations regarded as suspicious have been recorded experimentally as negative in this series. The positive ganglia in series "d", therefore, should not be included with the negative ganglia in series "c" as showing a distinct disagreement with the smear and section preparations.

From the numerous cases of suspected rabies submitted for examination, numbering from about 25 to 40 a month, it is our intention to accumulate further data as to both of these lines of investigation. The results above recorded we regard as pointing to the following conclusions:

1. That "Negri-like" bodies may occur in smear and section preparations from brains of animals dead from other causes than rabies, and also in association with Negri bodies in such preparations from rabic brains.
2. That true Negri bodies are only present in the central nervous tissue of animals which were suffering from rabies at the time of their death.
3. That in all cases submitted for diagnosis the ganglion nodosum should be preserved and, in the event of negative brain findings, examined for proliferative changes.
4. That section preparations of the ganglion nodosum showing diffuse or distinct localized proliferative changes *warrant a diagnosis of rabies*, though other material may be negative or not available for examination (tabular series "a" and "b").
5. That in cases where the brain material is negative and the ganglion shows distinct proliferation, it is probable that the Negri bodies escaped observation, or that the brain, through decomposition, mutilation, or other cause, was unsatisfactory for examination (tabular series "d").
6. That rarely section preparations of the ganglion nodosum may not show proliferative changes, though Negri bodies be present in the brain. Therefore a negative diagnosis should not be based upon a negative finding in the ganglion alone (tabular series "c" -2.2%).

1

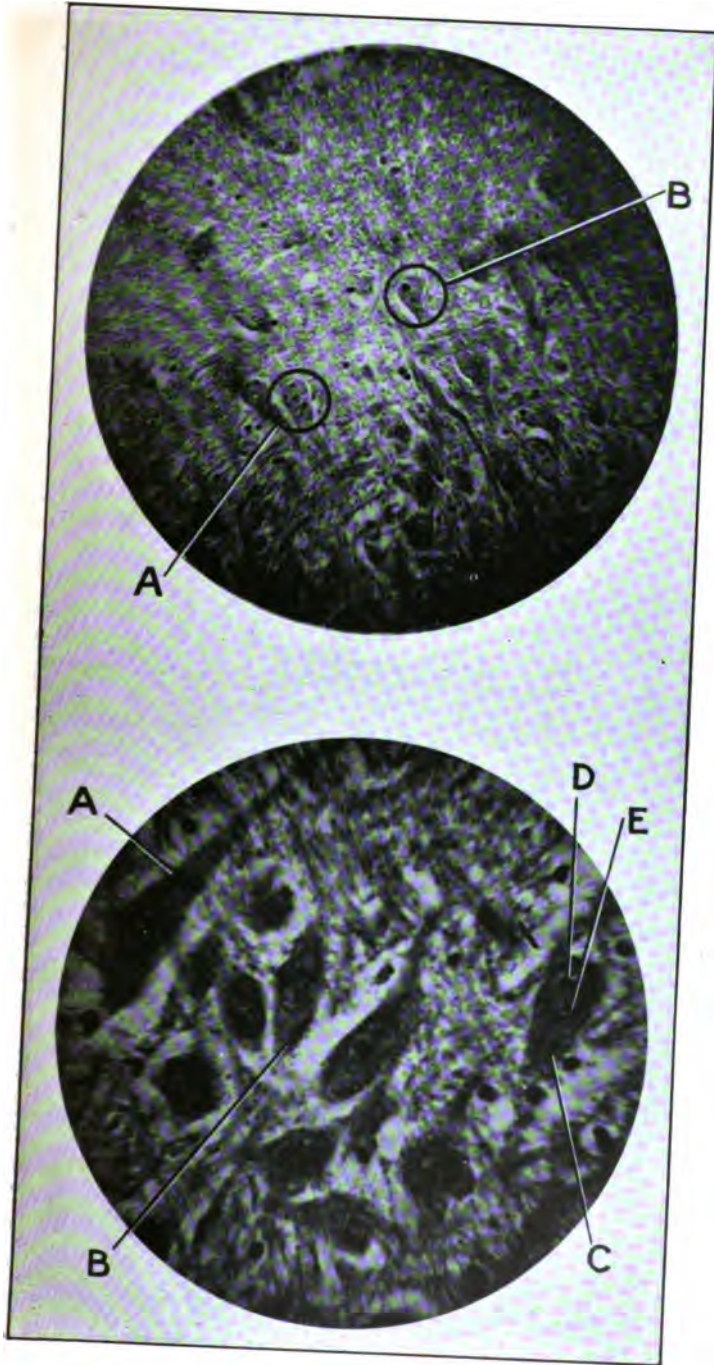


PLATE I. NOS. 1 AND 2.

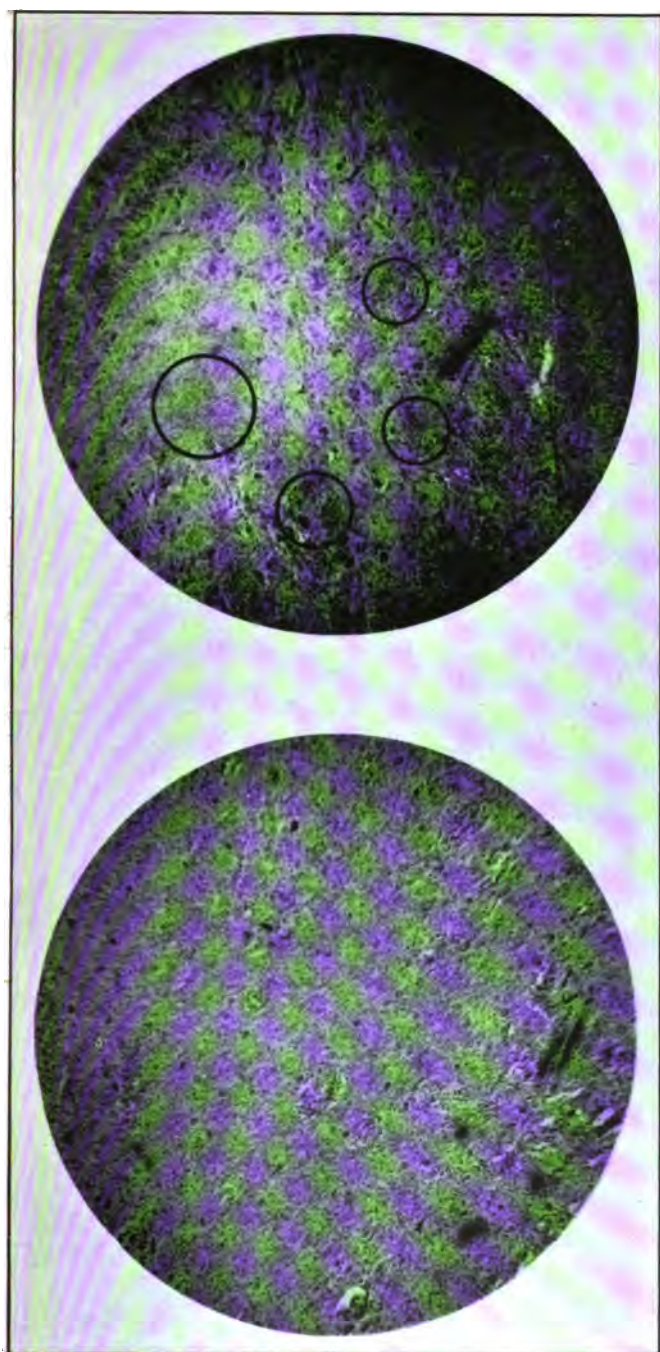


PLATE III. NOS. 5 AND 6.

THE MILK SUPPLY OF NEW YORK CITY—A LESSON IN MUNICIPAL SANITATION¹

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"She can milk; look you, a sweet virtue in a maid with clean hands."

—*Shakespeare.*

To furnish an adequate supply of pure milk to more than five million mouths is a task as difficult as it is interesting. The problem of New York City's milk supply presents one of the most important chapters in the complexities of modern urban life.

Far back in the early times, everyone had milk from his own cow. Later, a few received it from their neighbors in exchange for other products. As time progressed and villages and towns became more populated, some people made it their business to supply milk to the others. So far the consumers had more or less personal control of the milk supply, as each family patronized that dairyman, who they were confident would furnish them with pure milk, or at times they visited his farm to convince themselves of the purity of the product.

However, as town grew into cities, and cities became larger and larger, and the supply of milk had to be brought from more distant sections, the old intimacy between the producer and the consumer disappeared. A new regime of milk distribution sprang up. New factors had to be reckoned with, namely, the creamery, the railroad and the city distributor.

Civilization, with its accompanying improvements, exacts a penalty for any benefit it confers. While the housewife has been relieved of the responsibility of caring for her own cow, or selecting the dairyman—by having her milk delivered to her door—other drawbacks present themselves, principally in that the milk is often much inferior in grade, though the physical appearance is not changed.

Not so long ago it used to be a common practice to add water to milk, or to take off part of the cream, or even both at the same time. Furthermore many producers and dealers, in order to prevent the milk from souring, would make liberal use of chemicals such as starch, boric acid, formalin, etc. This practice went from

¹ The photos illustrating this article were supplied to Dr. Steckel through the courtesy of the New York City Department of Health.



FIG. 1. Unsanitary cow barn—condemned by N. Y. C. Dept. of Health.



FIG. 2. Modern sanitary dairy barn.

bad to worse, so much so that people soon awakened to these injurious frauds perpetrated upon them, and a clamor arose for milk inspection. Soon the state and municipal authorities inaugurated a form of milk supervision which consisted of a chemical analysis of the milk and the setting of a minimum standard for the water, fat, and solid content.

During many years it became apparent that the infant mortality in the large cities, especially in the congested sections, was appalling, and it dawned upon public spirited citizens and health authorities, that perhaps this useless loss of life resulted from the unsanitary and impure milk supply. Investigations and experiments were inaugurated and the fact was substantiated that the high percentage of infant mortality was, in a great measure, due to impure and adulterated milk. It was found that in proportion as the milk was filthy and contaminated with millions of bacteria, the diarrheal diseases among infants were increased; furthermore, that such diseases as tuberculosis, typhoid fever, diphtheria, septic sore throat and scarlet fever were disseminated through milk. *It became apparent that, in order to insure a pure milk supply, the supervision must extend from the time the milk leaves the cow until it reaches the consumer.*

This was no small undertaking when you consider that New York City consumes over 2,000,000 quarts of milk daily, produced by about 350,000 cows, scattered on 44,000 farms located in six states, is passed through 11,000 creameries and then shipped to New York, a distance of from 50 to 450 miles (in over 250 special milk cars); requires more than 6,000 wagons to deliver this milk in Greater New York, while there are about 14,000 stores retailing milk. All in all, it requires an army of 200,000 persons to carry out this gigantic task daily.

Unlike other food supplies, milk is one of the most essential articles of diet, since our very existence depends on it. In this twentieth century the majority of women cannot—and some do not want to—nurse their own babies, and therefore cow's milk is the only food on which to raise our children in order to perpetuate mankind, at least until some savant creates a substitute for cow's milk. The city baby, living in more confined quarters, with lack of air and sunshine, needs a thousandfold more care than its country cousin. As milk is practically the infant's only food, especially during the first year of its life, when it consumes close to 500 quarts

of milk, the necessity for a pure and wholesome milk supply cannot be emphasized too strongly.

Little does the mother dream that the apparently clean, white bottle of milk, delivered at her door, may harbor millions of filthy germs, which when fed to the baby may cause indigestion and other

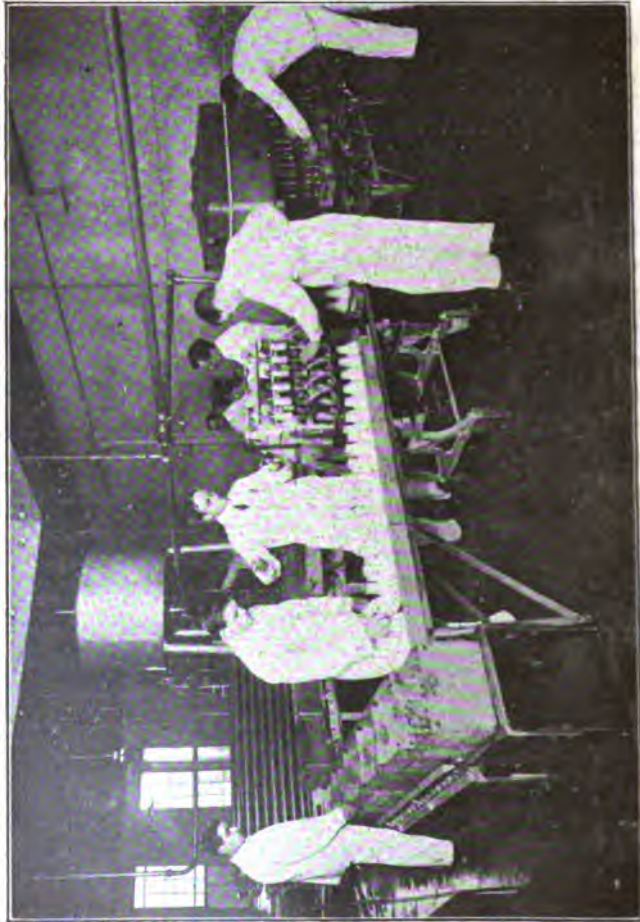


FIG. 3. Bottling milk—New York City supply.

troubles. Or, what is still worse, that this milk may be contaminated with infectious disease germs, and her baby, instead of thriving when fed with this life-giving fluid, may be taken sick and die. The color of the milk has long acted as a veil for many impurities contained in it. It is far more important to know the condition of

the milk from a sanitary and bacteriological standpoint, than to know its chemical composition. *The new science of bacteriology has contributed a great deal toward procuring a pure milk supply.* The number and kind of germs contained in the milk bear a direct relation to the manner and method of its production, handling and age.

Though, for a number of years, public spirited citizens and health boards have advocated stricter regulation of the milk supply, it was not until the general public became possessed with a strong desire for hygiene and sanitation, that the new methods of milk control were put into operation. Now, not alone is the milk examined chemically, but its purity is tested from a sanitary and bacteriological standpoint, and special stress is laid upon its freedom from germs. It took years of hard work to bring about this reform. The fight was a three-sided one—with the farmer, the milk company and the consumer. As difficult as it was to induce the farmer to inaugurate sanitary methods in his dairy, it was a harder task to bring about the reform in the transportation and distribution of milk.

The milk would come to the city at a high temperature, in dirty cans with broken covers. The dealer in turn would keep the milk an indefinite period and handle it recklessly while in process of distribution to the stores and homes. In the stores too, it was handled carelessly and exposed to contamination from dust, dirt and flies. The mother who would purchase this milk would keep it uncovered and in a warm temperature and feed the baby in a negligent and slipshod manner. Often when the baby would not consume the entire contents of the nursing bottle, the mother would keep the balance of the milk for the next feeding. All this time the milk would be exposed to contamination from dust and flies.

Tremendous changes have taken place recently in the more adequate provision for pure milk in New York City. Millions of dollars have been spent in the building and equipment of dairy barns, milk houses, creameries, pasteurizing plants and milk cars. The old sign "Keep out, this is private," is a thing of the past. Instead the public is cordially invited to visit and inspect every part of the work connected with the milk industry. With all precautions, it was still found that it was almost impossible to secure milk free from contamination with infectious disease germs, such as tuberculosis, typhoid, diphtheria, scarlet fever, etc., so the New

York Department of Health recently ordered that all milk received in New York City must be pasteurized, with the exception of the so-called grade A raw, guaranteed and certified milk. It has been ascertained by noted sanitarians that the pasteurization of milk, that is, heating it to a certain temperature, 145 degrees Fahrenheit



FIG. 4. New York City Dept. of Health Inspector taking milk samples.

for 30 minutes, will destroy many germs, including those causing infectious diseases.

The milk which arrives in New York City to-day is practically supervised from the time it leaves the cow until it reaches the consumer. All cows producing milk for New York City must be ex-

amined by a graduate veterinarian and their state of health approved. Board of health inspectors visit the dairy farms and see that the barns are kept in proper and sanitary condition, that the water supplied to the cows and used for washing the milk utensils, is pure, and that the milk is kept covered and at the proper temperature. Both the farmer and his employees must present a clean bill of health. In the event of illness either in the farmer's family or in the herd, the milk may not be sent to the city. The inspection is followed up at the creamery, where the same sanitary precautions are observed. In transit, on its arrival at the city depots, at the pasteurizing and bottling establishments and so on until the milk reaches the house of the consumer, the inspectors keep careful watch. Full control is kept over the product by means of a score card or check system, and by samples of milk taken at each stage of its journey for chemical and bacteriological examination.

There are now three grades of milk sold in the city. Grade A, both raw and pasteurized—for infants. The raw milk must come from cows free from tuberculosis, as shown by a tuberculin diagnostic test, it must conform to strict sanitary methods of production and handling, and must not contain more than a limited number of germs. It is distributed in bottles. Pasteurized milk comes from healthy cows and must be produced under sanitary conditions. The germ content is limited. It is also delivered in bottles. Grade B—is pasteurized milk for use by adults only. This milk comes from healthy cows and is produced under careful methods, but the germ content may be larger than in Grade A milk. Grade C—is milk which is not produced under as careful methods as the above grades. It must be pasteurized or boiled and be used only for cooking and manufacturing purposes. Aside from these grades there is the so-called certified milk which is produced under the most stringent sanitary methods, and must be certified by a medical commission.

It will thus be seen that the milk which is received in New York City to-day is produced under quite different methods from those in vogue a few years ago. The inspection begins on the farm and does not end until the milk reaches the consumer. In order to ship milk to New York City, the dairyman must have healthy cows, clean barns, pure water supply, clean utensils, milk with clean hands, he must discard any abnormal milk, and he must keep the milk cold until delivered at the creamery. He must not

the milk if there is an infectious disease at the farm. At the very too, the milk must be kept cool until pasteurized and be bottled under strict sanitary conditions. During transportation on milk trains, the milk must be kept cool and tightly sealed. In the city plant, on the wagons, at the stores, sanitary

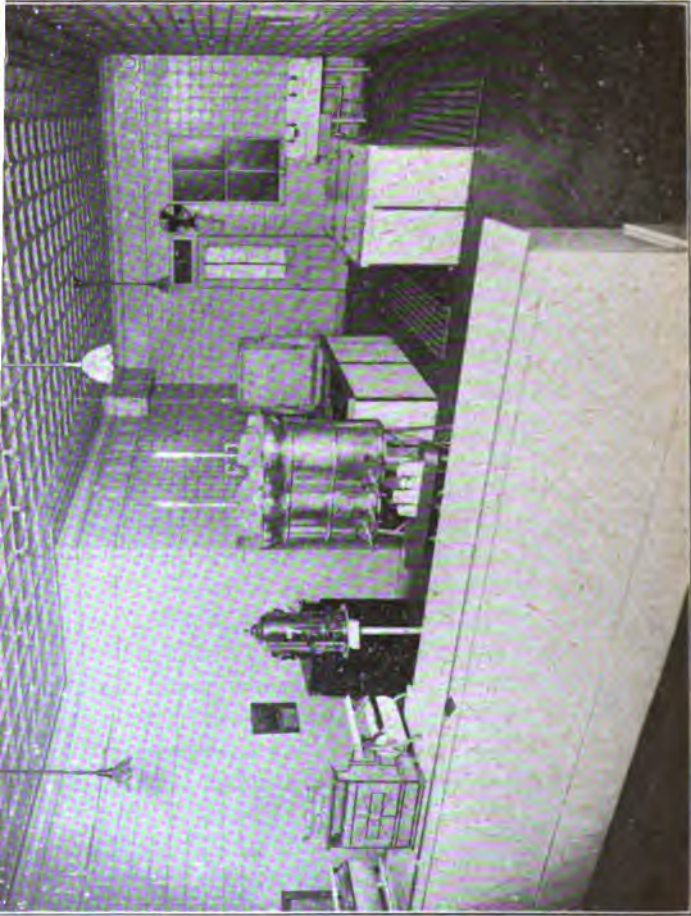


FIG. 5. Model milk store—New York City.

measures must be adhered to, in order to avoid any possible contamination.

The great chain of this pure milk problem has only one weak link, and that is the consumer. He has as yet not learned that some responsibility devolves upon him in this important question. Free

instruction as to the proper care and feeding of the baby is given to mothers at the milk stations, maintained by philanthropic agencies and by the Department of Health for the distribution of pure milk to the poor and needy. But this is not sufficient. A more energetic campaign should be inaugurated among housewives, as to the proper care of the milk after it reaches the home. Particularly should the housewife remember the three C's: Clean, Covered, Cool.

The fight for a sanitary milk supply for this city has finally been won. All factors are now harmoniously working together in an effort to supply New York City with the best milk obtainable. In my investigations of this question, I find that in comparison with other large cities, the milk in New York City is of a high standard. *As milk is a cheap, a nourishing and a wholesome food, people would do well to use it liberally in their daily diet.—American Medicine.*

Hon. T. J. Steele, of Iowa, in a speech on "Government Aid to the Farmer and Stock Raiser in Suppressing the Foot-and Mouth Disease" in the House of Representatives said, relative to the Bureau of Animal Industry: "Instead of knocking the men who worked day and night, Sundays and holidays to accomplish these results, let us show them our appreciation of their efforts, even though they, like others, have made a few mistakes; and I can assure you that if this herculean task had been accomplished in one of the European countries, these men, whom some of you have so severely criticised, would be wearing badges of honor or of merit for the results obtained."

Bureau of Animal Industry. Amendment to Regulation 9, section 2, paragraph 5.—Animals which are offered for ante-mortem inspection under this regulation, and which are regarded as immature, shall be marked "U. S. Suspect," and if slaughtered the disposition of the carcasses shall be determined by the post-mortem findings in conjunction with the ante-mortem conditions. If not slaughtered as suspects, such animals shall be held under Bureau supervision and after sufficient development may be released for slaughter, or may be released for any other purpose, provided they have not been exposed to any infectious or contagious disease. Animals found dead or in a dying condition on premises of an official establishment shall be marked "U. S. Condemned" and disposed of in accordance with section 8 of this regulation.

THE VALUE OF EFFICIENT, COMMERCIAL PASTEURIZATION IN SAFEGUARDING MILK NATURALLY INFECTED WITH TUBERCLE BACILLI

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The necessity of pasteurization in safeguarding the milk supply has become universally recognized. One of the main reasons for such procedure is the frequency with which bovine tubercle bacilli are present in ordinary market milk. The claim has been made, however, that pasteurization as commercially carried on in large city milk plants does not render milk from tuberculous cattle safe. In reviewing the literature on the thermal death point of tubercle bacilli, it becomes evident that the difference of opinion on this question is great. The American workers seem to accept the view that tubercle bacilli are not more resistant to heat than non-spore bearing organisms, while some Europeans hold the opposite view. Below is a brief review of the most important literature on this subject:

SMITH, THEOBALD: The Thermal Death Point of Tubercle Bacillus in Milk and Other Fluids. *Jour. of Experim. Med.*, Vol. 4, 1899, p. 217.

He suspended tubercle bacilli in milk, water, salt solution, etc., and exposed these to a temperature of 60° C. (140° F.) for various periods. Tubercle bacilli suspended in water and salt solution were destroyed in 15 to 20 minutes. To determine the viability of the organisms he made cultures and guinea pig inoculations. Controls were also inoculated. Tubercle bacilli were also suspended in milk and exposed to 60° C. in ordinary tubes with cotton plugs or glass stoppers. In one instance he was still able to produce generalized tuberculosis in guinea pigs even after milk was exposed 60 minutes. When he used sealed tubes and immersed them in the water bath, tubercle bacilli suspended in milk were no longer capable of producing tuberculosis in guinea pigs after being exposed for 17 minutes. In one instance, however, heating at 60° C. for 17 minutes caused, in the inoculated guinea pig, a suspicious subcutaneous lymph node from which he made no reinoculations. "Lesions were, however, so light," he says, "if due to living organisms, that one bacillus may have caused it."

Caseous material from tuberculous bovine lung was suspended in bouillon and was destroyed when exposed to 60° C for 20 minutes. His conclusions contain an explanation for the resistance of tubercle bacilli in milk in unsealed tubes.

Conclusions: 1. Tubercle bacilli, when suspended in distilled water, normal salt solution, or bouillon, and milk, are destroyed at 60° C. in 15 to 20 minutes. The larger number are destroyed in 5 to 10 minutes.

2. When tubercle bacilli are suspended in milk the pellicle which forms during the exposure at 60° C. may contain living bacilli after 60 minutes.

RUSSELL & HASTINGS: Thermal Death Point of Tubercle Bacilli under Commercial Conditions—Agricultural Experiment Station of University of Wisconsin 17th *Annual Report*, 1900.

These observers confirmed Smith's work. In five series of experiments, milk was inoculated with pure cultures of bovine tubercle bacilli and heated at 60° C. (140° F.) in a commercial rotary pasteurizer (Potts) and kept at that temperature for various lengths of time from 5 to 45 minutes. To test the thermal death point they inoculated guinea pigs intraperitoneally. Control guinea pigs were inoculated with unheated milk. "The conclusions from these series indicate that an exposure of 10 minutes at 60° C. (140° F.) is sufficient to destroy the vitality of the tubercle organism so completely that large doses inoculated in the most susceptible portion of a very susceptible animal (guinea pig) fail to produce any development of the disease, while unheated samples of milk and those exposed to 60° C. (140° F.) for 5 minutes produced the disease without exception."

In another experiment consisting of two series of tests, a comparison was made of heating milk at 60° C. in the commercial pasteurizer and in open bottles placed in a water bath. In the latter case the milk remained in a quiescent condition and was exposed to the action of the air which permitted a film to form on the surface. Where the milk was exposed in a quiescent condition as in a glass tube or bottle, tubercle bacilli were more resistant than where the milk was in a closed receiver and agitated. While all tubercle organisms were destroyed in the commercial pasteurizer in ten minutes, neither an exposure for this period nor for 15 minutes sufficed to destroy the same lot of organisms when the milk was kept in a quiescent condition at a similar temperature in vessels to which air had more access. The exposure in these two series at 60° C. was not continued longer than fifteen minutes. They conclude, "It is recommended in order to thoroughly pasteurize milk, so as to destroy any tubercle bacilli, which it may contain, without in any way injuring the creaming properties or consistency, to heat in closed pasteurizer for a period not less than 20 minutes at 140° F. (60° C.)."

These workers have further shown (On the Increased Resistance of Bacteria in Milk Pasteurized in Contact with Air—Agric. Exp. Station of University of Wisconsin 18th *Annual Report*, 1901) that the pellicle formation or scalded layer increases the resistance

not only of tubercle bacilli, but of other organisms. In their case they were working with cocci.

M. J. ROSENAU: Thermal Death Point of Pathogenic Microorganisms.—*U. S. Hygienic Laboratory Bulletin* 42, 1908.

Rosenau performed a series of 9 experiments with 5 different virulent bovine strains. These were suspended in 15 to 20 c.c. milk, rubbed up in mortar, and heated to 60° C. in open test tube disregarding scum formation. The temperature was 60° C. unless otherwise stated. Guinea pigs were inoculated intraperitoneally with .5 c.c. The experiments were checked and secondary inoculations were made in all suspicious cases.

1st exp. Milk exposed 5 minutes produced tuberculosis in 2 inoculated guinea pigs. Exposure for 10 minutes failed to produce tuberculosis while exposure for 20 minutes produced tuberculosis in one pig and questionable results in the other; reinoculations from latter caused generalized tuberculosis.

2nd exp. Milk heated for 12 minutes produced tuberculosis in inoculated guinea pigs while exposure 15, 18 and 20 minutes, respectively, failed to produce the disease.

3rd exp. Milk exposed to 65° C. in this test and it took 5 minutes to heat to 65° C. Guinea pigs inoculated with milk after it reached 65° C. and thereafter in 1, 5, 8, 10, and 15 minutes respectively, failed to develop tuberculosis.

4th exp. Milk exposed 2 and 5 minutes respectively produced tuberculosis in inoculated guinea pigs.

Milk exposed 10, 15, 18 minutes, etc., respectively, failed to produce tuberculosis in inoculated guinea pigs.

5th exp. (Temperature in this experiment 64.8 to 65.1). Milk inoculated when it reached 65° C. which took 5 minutes, failed to produce tuberculosis in inoculated guinea pigs. Exposure to 65° C. for 2, 3, 5 minutes respectively, also gave negative results.

6th exp. Two minutes exposure at 60° C. failed to destroy tubercle bacilli. 3, 4, and 5 minutes respectively, destroyed tubercle bacilli, and failed to produce tuberculosis in inoculated guinea pigs.

7th exp. Milk exposed 1, 2, 3, and 4 minutes respectively, failed to produce tuberculosis in inoculated guinea pigs. It took 4½ minutes for milk to reach 60° C.

8th exp. Milk inoculated into guinea pigs that had reached 60° C. which took 5 minutes, failed to produce tuberculosis in these animals. With milk exposed 1, 3, and 4 minutes respectively, negative results were also obtained.

9th exp. Milk exposed 3 minutes at 60° C. produced tuberculosis in inoculated guinea pigs. 4, 5, 6, and 8 minutes' exposure destroyed tubercle bacilli organisms as evidenced by guinea pig inoculations.

It is somewhat difficult to reconcile Rosenau's findings with those of Smith and Russel & Hastings, since these workers, especially Smith, insisted that unless pellicle formation was prevented tubercle bacilli would sometimes withstand long exposure to 60° C., and in one of his experiments heating for 60 minutes at 60° C. failed to destroy the tubercle bacilli.

Rosenau's article reviews practically all the recorded work on "Thermal death of tubercle bacilli" done up to that time. The difference of results is marked and it is unfortunate that work was not done under like conditions. The fact that guinea pig inoculations are necessary to establish the viability of the organism may explain the many positive results since, as is pointed out by Rosenau and demonstrated by others before, dead tubercle bacilli are capable of producing tubercular-like lesions even with caseation. Organisms from such lesions may be demonstrated microscopically, but animals inoculated from such lesions show no evidence of tuberculosis. The following excerpts from his review seem most important:

SCHROEDER's work is of interest since he thought that by heating milk at 60° C. for 15 minutes he would destroy other organisms, but not tubercle bacilli. All his guinea pigs receiving such milk, however, failed to develop tuberculosis, even those milks that were artificially infected with tubercle bacilli.

MARSHALL OF MICHIGAN, 1899: Sterilized milk infected with tuberculous material of cows and placed in shallow vessels and put into pail sterilized, and when exposed at 68° C. for 20 minutes the tubercle bacilli were killed. Animal inoculations were used to demonstrate the vitality of the organisms.

RABINOWITCH, 1900, made the statement that recent investigations at Institute für Infektionskrankheiten in Berlin had shown that tubercle bacilli are surely killed only at 100° C. Her results recalled the fact that tubercle bacilli like other organisms containing fat are more resistant to heat and that this may account for irregular results obtained by investigators. (The original was not consulted.)

HERR IN 1901 shook up cream with tuberculous sputum and placed it in sealed tubes containing 4 c.c. each. The tubes were brought to desired temperature and maintained in water bath at desired temperature and length of time.

The following exposures effectively destroyed tubercle bacilli as indicated by animal inoculation: 65° C. for 15 minutes; 68° C. for 15 minutes; 70° C. for 7 minutes; 72° C. for 7 minutes; 75° C. for 3 minutes; 80° C. for 3 minutes; 85° C. for 5 seconds; 85° C. for 5 minutes; 89° C. for 30 seconds; 90° C. for 5 seconds; and 95° C. for 5 seconds. 80° C. for 5 seconds still produced tuberculosis.

Herr recommends 85° C. for two minutes as the most practical exposure for cream from which butter was to be made. This is accomplished by the continuous pasteurizer.

HESS, 1901, inoculated sterilized milk with human tubercle bacilli. The samples were then sealed up in small tubes and dropped into a sterilizer and kept there for 20 minutes at 57°, 58°, and 60° C., respectively. Guinea pigs inoculated with milk exposed at 57° and 58° C. developed tuberculosis, while animals inoculated with 60° C. heated milk did not develop tuberculosis.

LEVY AND BRUNS, 1901, showed that a temperature varying between 65° and 70° C. and operating for 15 to 25 minutes effectually killed human and bovine tubercle bacilli in milk. Pellicle formation was prevented in their experiment.

BANG, 1902: Pellicle formation prevented, obtained following results with rabbits inoculated intraperitoneally:

60°—15 minutes—Prevented tuberculosis in 2 animals, but 2 others became slightly tuberculous.

65°—0 to 15 minutes—Effectually prevented tuberculosis.

70, 75, 80 and 85 momentarily, effectually prevented tuberculosis.

From these and feeding experiments on rabbits and hogs Bang concludes that while heating at 60° C. for 15 minutes does not prevent peritoneal infection, it weakens the bacteria so that they are innocuous by way of the alimentary tract. In testing the viability of these organisms on glycerine bouillon cultures he found cultures failed to develop after exposure to 60° and 65° C. for five minutes, although unheated controls grew well.

RUSSELL AND HASTINGS, 1904: Milk infected with human and bovine tubercle bacilli, guinea pig inoculation being used. Exposed in continuous pasteurizer, where it took $\frac{3}{4}$ of a minute to reach desired temperature when exposed for 1 minute at 160° F. (71.1° C.) it was freed from living tubercle bacilli. The authors do not unreservedly recommend this temperature and exposure for routine practical pasteurization without further investigation.

An interesting mention is made in Rosenau's review of Barthel and Stentroms' work in 1901 when he says, "They report some preliminary work which must be interpreted as showing the influence of coagula in protecting the tubercle bacilli from action of heat. This clot formation was probably due to the abnormal reaction of the pathological fluid from tuberculous udders employed. Animals injected with this material became tuberculous after it had been heated to 75° for 15 minutes and to 80° for 10 minutes."

In 1904 BARTHEL AND STENTROM continued their work relative to the effect of milk reaction upon resistance to heat of contained tubercle bacilli.

Two milks were used, one neutral which withstood 90° C. without coagulating and the other abnormally acid which coagulated

at 60° C. At 80° C. one minute exposure killed in uncoagulated milk, but not in coagulated (acid) milk. At 85°, momentary exposure failed to kill in either. One minute exposure killed in uncoagulated, but not in coagulated milk. Rosenau concludes, "While these experiments are very limited in scope, they at least suggest a source of error in the work of those who used the secretions of tubercular udders in their experiments. Such material is prone to be abnormal in reaction and protective clots may have been formed."

Since Rosenau's work, very little other work on this subject could be found in the literature. Interesting among the more recent publications is a controversy over the thermal death point of tubercle bacilli in milk between Professor Forster of Strassburg and Basenau of Amsterdam. Professor Forster concluded from some of his work that bovine tubercle bacilli in milk contained in a bottle and subjected for 30 minutes to 70° to 72° C. were destroyed. This assertion caused Basenau to take issue with Forster especially in view of De Jong's and Van der Sluis' findings. (These findings are given later.) Basenau concludes that milk naturally infected with tubercle bacilli cannot be made ("Krankheitsfrei") non-pathogenic by exposure at 70° to 72° C. for ½ hour, and the danger from such milk is only lost after heating at 80° C. for 1 hour. Professor Forster's answer to this is contained in *Beitrage zur der Abtötung von Tubercillen durch Erhitzung*, Centr. Bakt. Abt. I, original Vol. 55, 1910.

Among other tests the following were performed by Professor Forster: He obtained naturally infected milk, placed in ½ liter flask and exposed under water heated at 65 to 66° for 15 minutes in one instance, and for 20 minutes in another. Both exposures destroyed tubercle bacilli as indicated by intraperitoneal inoculations into guinea pigs with centrifuged milk. Experiments were carefully controlled and reinoculations in suspicious cases were made with negative results.

De Jong's view is contained in *Pasteurisierung der Milch in Ruhe und Abtötung von Tuberkelbacillen*. *Centralbl. für Bakt. Abt. 1 originale* 48, 1908-09. He concludes:

1. Not only do tubercle bacilli from bovines, but also those from the horse, goat, sheep, man, swine and cat withstand pasteurization of 71 to 72° C. for ½ hour.
2. The same resistance is shown in naturally infected tuberculous milk as in milk infected with natural tuberculous products.
3. The mentioned pasteurization cannot, under all conditions, destroy tubercle bacilli.
4. Milk so heated must not be considered as pathogenic free and should not be sold under such name.

He draws the above conclusions from results of experiments in which he used naturally infected milk and artificially infected

milk with tuberculous uterine secretions. Such milks were heated in $\frac{1}{2}$ liter flasks and placed in Oswald water bath and temperature regulated by Toluol. Exposure was for at least $\frac{1}{2}$ hour at 71 to 72°. *Van der Sluis' work* *Über die Abtötung der Tuberkelbacillen in natürliche infizierter Milch und über die Pasteurisierung der Milch. Centralbl. für Bakt. abt 1, originale 50, 1909.*

The importance of obtaining naturally infected milk appealed to Van der Sluis and he used such cases as he was able to autopsy soon after obtaining the milk, and demonstrated the extent and localization of the tuberculous infection. With the exception of a few cases the milks experimented with were shown microscopically to contain tubercle bacilli. Only such milk was used as was normal in appearance and which did not coagulate or thicken upon heating. The warming of the milk was done in the usual way as is the custom in most of the large Holland dairies. The usual milk bottles with a patent stopper (Bügelverschluss) were filled with milk and put into a pasteurizing apparatus under water and then brought to the desired temperature for a fixed time. Milk was then quickly cooled. Extra precautions were taken in procuring the milk, such as cleansing and disinfecting the udder and hind quarters and disinfection of milker's hands, etc. Five c.c. of milk were injected into right and five c.c. into left inguinal region in each test. This 10 c.c. of milk was obtained from 100 c.c. of centrifuged milk, using both sediment and cream. Finding that exposure to 65 and 70° for $\frac{1}{2}$ hour failed to destroy tubercle bacilli, he exposed the milk to 70° C. for one hour. This also proved insufficient to kill the tubercle bacilli. 75° C. for $\frac{1}{2}$ hour caused the development of tuberculosis in 45% of the inoculated animals. For an hour at 75° C. it failed to prevent the development of tuberculosis in 46% of the guinea pigs. 80° C. for $\frac{1}{2}$ hour also proved insufficient to destroy tubercle bacilli. 80° C. for one hour, however, proved sufficient to prevent tuberculosis in the inoculated animals. He says, "The entire results can be summed up: That naturally infected milk coming from animals with udder tuberculosis in general can be made free from living tubercle bacilli by heating to at least 80° C. for at least one hour, under the conditions of this experiment whereby the milk was heated in flasks, therefore in a quiescent state."

He proved that in milk infected artificially, tubercle bacilli are less resistant than in naturally infected milk. In the former case the bacilli were destroyed at 70° C. for an hour, while in the latter, as already observed, it required 80° C. for the same time. He however agrees with De Jong's findings.

In the 1903 edition of *Kolle & Wasserman's Handbuch der Pathogenen Microorganismen*, CORNET & MEYER, after quoting various works, most of which were mentioned above, sum up the subject by stating, "The following general conclusion can only be drawn: To destroy tubercle bacilli in fluid media (culture, milk,

the following exposures are necessary: 4-6 hours at 55° C.; 1 hour at 60° C.; 10-20 minutes at 70° C.; 5 minutes at 80° C.; 1-2 minutes at 90° C.

In the 1913 edition of this work, CORNET & KOSSEL take a different view. They state regarding the resistance of tubercle bacilli in milk to heat, that works on this subject do not altogether agree, and in part, this disagreement may be explained by Theobald Smith's observation where he claims that the pellicle formed by the heating of milk encloses some of the bacteria which avoid the destruction. They quote many of the works reviewed in this project and conclude that the manner of heating the milk in these experiments must be taken into consideration in interpreting the results.

SCHORER, E. H. & ROSENAU, M. J. Tests of the Efficiency of Pasteurization of Milk under Practical Conditions. *Journal of Medical Research*, Vol. XXVI, No. 1 N. S. Vol. XXI, pp. 127 to 158.

These workers in testing the efficiency of practical pasteurization used a holding system which consisted of a receiving vat, a milk pump, a heater and a holding tank. The heating was done by pumping the milk over the outside of the heating drum in the inside of which was steam heated water and a layer of steam above the water directly under the drum. From this heater the milk flowed into a holding tank and was held for various lengths of time at 140° to 145° F.

The batches of milk tested were artificially inoculated with *B. typhosus*, *B. diphtheriae*, *B. tuberculosis* (human, bovine).

With this type of pasteurization which is now largely discontinued, the desired temperatures were not obtained because the milk in running over the drum was not heated uniformly and formed in layers in the holding tank, the coldest being on the bottom and was drawn off first.

The results show that in two tests with *B. diphtheriae*, one failed to destroy this organism, in two tests with *B. typhosus* similar results were obtained, in two tests with *B. tuberculosis* (human) both failed to destroy the organisms, and in two tests with *B. tuberculosis* (bovine) one failed. It is very evident that the failure recorded by these experiments was due to the inability, with the machinery used, to obtain and maintain the desired temperatures.

The objection to the above experiments is that not only do they disagree as to the thermal death point of the tubercle bacillus but they were in no case dealing with naturally infected milk pasteurized under commercial conditions such as prevail today in all large modern city milk plants; and which is the vital point that concerns us. An opportunity to obtain this desired information was

presented to the writers by the following conditions: in the latter part of 1913 the University of California and the Los Angeles Health Department began semi-annual tuberculin testing of a herd of 325 head of dairy cattle, which were known to be heavily infected with tuberculosis. The land occupied by these cattle was divided by a railroad right of way into two distinct ranches. Following the first and each subsequent test all reacting animals were kept on one ranch and all healthy animals on the other. Calves from both herds were kept on the healthy ranch, raised on pasteurized milk, tested when large enough to turn out on pasture, and the non-reactors used to replenish the great losses to the healthy herd which the first and subsequent tests caused. This produced a herd which at the time of its greatest numerical strength numbered 500 head of cattle, all tuberculous, which were under constant observation and the milk from which was allowed to be sold in the city of Los Angeles after it had been pasteurized. This work was done under a voluntary agreement with the owner and had for its object the determination of the practicability of changing an extensively tubercular herd into a sound one without any great financial loss or inconvenience to the owner.

Animals in the reacting herd, as soon as they showed apparent evidence of tuberculosis were removed, but no special means of ascertaining such cases by auscultation, percussion, or laboratory examination of secretions and excretions were resorted to.

The milk from this herd was pasteurized in one of the large city milk plants in the regular routine manner of pasteurizing all milk going through the plant, and no special treatment was given it. The fact thus became apparent that here was an ideal opportunity to study the effect of ordinary pasteurization in a large, well equipped, modern city milk plant on tubercle bacilli, gaining access to the milk under natural conditions from a tuberculous herd.

METHOD OF PROCEDURE: *Collection of Samples:* The volume of milk coming from this tuberculous dairy amounted to from 350 to 500 gallons per milking. It was cooled on the ranch with an ordinary tubular milk cooler, run into ten gallon cans and brought to the city milk plant twice daily. As this milk was being run from the weigh tank into the clarifier samples were taken, this constituted our raw milk samples mentioned below. When clarified samples were desired they were obtained as the milk flowed from the clarifier into the pasteurizing vat.

The pasteurizing in this plant is done in a battery of three large rectangular vats, each having a capacity of 500 gallons. These vats are insulated on the sides and top with a three-inch layer of hair felt. On the bottom is a five-inch water jacket. Through the center of the vat is a revolving multiple feed worm coil of two-inch tinned copper pipe, having a diameter of 24 inches, which keeps the milk in constant agitation while it is being heated, and thus prevents pellicle formation and insures uniform heating of the entire volume of milk. When the milk flows from the clarifier into the vat, steam is turned into the water, which is circulated by means of a suction tee from the 5-inch water layer on the bottom of the vat through the coil, so that the heating surface includes the entire bottom of the vat in addition to the coil area. Steam is turned on as soon as milk begins to flow into the vat and from 20 to 30 minutes is required to fill the vat and bring this large volume of milk to the pasteurizing temperature. During this heating period each vat of milk is sampled, and either milk or cream added, as the occasion may require, to bring the butter fat content to 4.2%. Connected with each vat is a self-recording thermometer, which keeps record of the temperature of the milk at all times while it is in the pasteurizer. When the desired temperature is reached, the steam is turned off and the surrounding insulation holds the milk at an even temperature for the pasteurizing period, ranging from 20 to 30 minutes. The exit valve at the bottom is then opened and the milk flows over a cooler, which brings the temperature down to 40° Fahrenheit. From 15 to 20 minutes is required to empty the vat, so that the last milk leaving gets this additional time in the heating chamber at the pasteurizing temperature.

The object of having three vats is to keep a continuous flow of pasteurized milk into the bottle fillers.

At the beginning of the sample collecting, the temperature of the recording thermometer was used as the guide. In checking this with the actual temperature of the milk there was found to be a variance at times of several degrees, due to slight movement of the arm of the pen point in removing old record sheets and replacing them with new ones. This method of getting temperatures was therefore checked with temperatures taken direct by means of raising the lid of the pasteurizer and placing a tested thermometer directly into the milk. Also, the first samples taken were dipped from the vat

and placed in the 110 c.c. glass bottle without cooling. This was also discontinued after December 1, 1915, and the remaining samples collected at the expiration of the desired time by dipping the sample bottle directly into the pasteurizing vat. When full, it was corked and immediately plunged into ice water previously prepared, and thus cooled down very rapidly on account of the small volume. The samples were preserved at the beginning of the work by the addition of .5% boric acid, which later, commencing with sample No. 16, was increased to 1%. The samples were forwarded for examination to the Division of Veterinary Science, University of California, at Berkeley by parcel post.

EXAMINATION OF SAMPLES: The milk reached the Veterinary Science Laboratory within 24 to 48 hours after collection. Upon the arrival of the milk at the laboratory or as soon afterwards as possible, about 90-95 c.c. were centrifuged for 20-30 minutes at a speed of 2700 per minute. The cream and sediment resulting from such centrifuging were inoculated subcutaneously or intramuscularly into two or three guinea pigs. Since the only practical method to determine definitely the presence or absence of tubercle bacilli in milk collected under ordinary conditions is guinea pig inoculation, this was done in all cases, the entire data of which is contained in Table I. Tubercle bacilli were demonstrated in the guinea pig lesions in all cases where a diagnosis of tuberculosis was made. In all cases with suspicious lesions, which consisted almost entirely of enlarged local lymph glands, reinoculations were made, even though tubercle bacilli were not demonstrated microscopically.

SUMMARY AND CONCLUSIONS: To determine the efficiency of commercial pasteurization in killing tubercle bacilli, 61 samples of milk were used. All these samples were from a herd consisting entirely of cattle which had reacted to the tuberculin test. Two or three guinea pigs were inoculated with the cream and sediment obtained by centrifuging 90 to 95 c.c. of each sample.

Of the 24 samples of raw milk used, all except one (sample No. 5) produced tuberculosis in the inoculated guinea pigs. In this one case both inoculated pigs died from septicemia. All the above samples except five produced tuberculosis in all the inoculated guinea pigs. For samples Nos. 1 and 2 one guinea pig in each case developed tuberculosis, while the other remained well. From samples 8, 43 and 44 one guinea pig in each case developed tuberculosis while the other died soon after the inoculation.

TABLE I.

No. of Sample	Date Received	Nature of Milk	Guinea Pig Number and Date of Inoculation	Results and Other Remarks
1	3-VII-15	Raw	406. 4-VII-15. Intramuscular	406 died 20-VIII-15. Ruptured spleen. Generalized tuberculosis.
			407. 4-VII-15. Subcutaneous	407 chloroformed 18-IX-15. Negative for tuberculosis.
2	3-VII-15	Raw	408. 4-VII-15. Intramuscular	408 chloroformed 18-IX-15. Generalized tuberculosis.
			409. 4-VII-15. Subcutaneous	409 chloroformed 18-IX-15. Enlarged preaural gland, but no tubercle bacilli found. Reinoculated into guinea pig 506, 20-IX-15. Chloroformed 23-XI-15. Negative for tuberculosis.
3	3-VII-15	Pasteurized 140°C. for 30 minutes. 350 gallons same as 1 and 2 and 150 gallons from dairy containing 20% tuberculous cattle.	410. 4-VII-15. Intramuscular	410 chloroformed 18-IX-15. Negative for tuberculosis.
			411. 4-VII-15. Subcutaneous	411 chloroformed 18-IX-15. Negative for tuberculosis.
4	3-VII-15	Same as Sample No. 3.	412. 4-VII-15. Intramuscular	412 chloroformed 18-IX-15. Large preaural and sublumbar glands, but no bacilli demonstrated. (Reinoculated into guinea pig 505 20-IX-15. Chloroformed 23-XI-15. Negative for tuberculosis.
			413. 4-VII-15. Subcutaneous	413 chloroformed 18-IX-15. Negative for tuberculosis.
5	17-VII-15	Raw	414. 17-VII-15. Subcutaneous	414 and 415 dead 21-VII-15. Septicemia.
			415. 17-VII-15. Subcutaneous	
6	17-VII-15	Same as No. 5 after clarification.	416. 17-VII-15. Subcutaneous	416 and 417 dead 19-VII-15. Septicemia.
			417. 17-VII-15. Subcutaneous	

No. of Sample	Date Received	Nature of Milk	Guinea Pig Number and Date of Inoculation	Results and Other Remarks
7	17-VII-15	Pasteurized. No exposure given. Same as No. 5 and No. 6 but containing 30% other milk from cows 20% tuberculous.	418. 17-VII-15 Subcutaneous	418 and 419 chloroformed 24-IX-15. Negative for tuberculosis.
			419. 17-VII-15 Subcutaneous	
8	6-VIII-15	Raw	442. 6-VIII-15 Intramuscular	442 dead 17-VIII-15. Not autopsied.
			443. 6-VIII-15 Intramuscular	
9	6-VIII-15	Same as No. 8. Pasteurized 140°F. for 23 minutes.	440. 6-VIII-15 Intramuscular	443 chloroformed 5-X-15. Generalized tuberculosis. 440 and 441 chloroformed 30-X-15. Negative for tuberculosis.
			441. 6-VIII-15 Intramuscular	
10	21-VIII-15	Raw	487. 21-VIII-15 Subcutaneous	487 dead 21-X-15. Generalized tuberculosis.
			488. 21-VIII-15 Intramuscular	
11	21-VIII-15	Same as No. 10. Pasteurized 140°F. for 23 minutes.	489. 21-VIII-15 Subcutaneous	488 chloroformed 19-X-15. Generalized tuberculosis. 489 and 490 chloroformed 27-X-15. Negative for tuberculosis.
			490. 21-VIII-15 Intramuscular	
12	24-IX-15	Raw	513. 24-IX-15 Subcutaneous	513 chloroformed 1-XI-15, sublumbar, preaural and inguinal glands affected with tuberculosis.
			514. 24-IX-15 Intramuscular	
14	22-X-15	Raw	515. 24-IX-15 Intramuscular	514 and 515 chloroformed 1-XI-15. Generalized tuberculosis.
			526. 23-X-15 Subcutaneous	
15	22-X-15	Same as No. 14; pasteurized. No exposure given.	527. 23-X-15 Intramuscular	526 and 528 chloroformed 10-XII-15. Generalized tuberculosis.
			528. 23-X-15 Intramuscular	
	22-X-15		531. 23-X-15 Subcutaneous	527 chloroformed 24-XI-15. Generalized tuberculosis.
			532. 23-X-15 Intramuscular	
			533. 23-X-15 Intramuscular	531, 532 and 533 chloroformed 10-XII-15. Negative for tuberculosis.

No. of Sample	Date Received	Nature of Milk	Guinea Pig Number and Date of Inoculation	Results and Other Remarks
16	30-X-15	Raw	539. 30-X-15 540. 30-X-15	539, 540 and 541 chloroformed 31-XII-15. Generalized tuberculosis.
17	30-X-15	Same as 16; pasteurized for 20 minutes at 140°F.	541. 30-X-15 536. 30-X-15 537. 30-X-15 538. 30-X-15	536, 537 and 538 chloroformed 3-I-16. Negative for tuberculosis.
18	24-XI-15	Raw	550. 24-XI-15 551. 24-XI-15	550 and 551 chloroformed 30-XII-15. Generalized tuberculosis.
19	24-XI-15	Same as 18; clarified.	552. 24-XI-15 553. 24-XI-15	552 and 553 chloroformed 3-XII-15. Generalized tuberculosis.
20	24-XI-15	Same as 18 and 19, but pasteurized for 30 minutes at 145°F.	554. 24-XI-15 555. 24-XI-15	554 and 555 chloroformed 3-I-16. Negative for tuberculosis.
21	26-XI-16	Raw	558. 26-XI-15 559. 26-XI-15	558 chloroformed 31-XII-15. Generalized tuberculosis. 559 died 5-II-16. Generalized tuberculosis.
22	26-XI-16	Same as 21, but clarified.	560. 26-XI-15	560 chloroformed 31-XII-15. Generalized tuberculosis.
23	26-XII-15	Same as 21 and 22; pasteurized for 23 minutes at 140°F.	561. 26-XI-15 562. 26-XI-15 563. 26-XI-15	561 died 2-XII-15. Not autopsied. 562 and 563 chloroformed 22-I-16. Negative for tuberculosis.
24	1-XII-15	Raw	564. 1-XII-15 565. 1-XII-15	564 and 565 chloroformed 1-II-16. Generalized tuberculosis.
25	1-XII-15	Same as 24, but clarified.	566. 1-XII-15 567. 1-XII-15	566 and 567 chloroformed 11-II-16. Generalized tuberculosis.
26*	1-XII-15	Contained 40 gal. other milk (4% tuberculous cattle) and 460 gal. as 24 and 25. Pasteurized for 20 minutes at 145°F.	568. 1-XII-15 569. 1-XII-15	568 and 569 chloroformed 1-III-16. Negative for tuberculosis.

*In this case self-recording thermometer registered 140°F., but was 5° lower than actual temperature of milk due to movement of pen point of recorder. Recording thermometer in all future samples was checked with tested thermometer placed directly into vat of milk by raising lid.

No. of Sample	Date Received	Nature of Milk	Guinea Pig Number and Date of Inoculation	Results and Other Remarks
27	2-XII-15	Raw	570. 2-XII-15 Intramuscular	570 and 571 chloroformed 10-II-16. Generalized tuberculosis.
28	2-XII-15	Same as 27, but clarified.	571. 2-XII-15 Subcutaneous	572 and 572A chloroformed 11-II-16. Generalized tuberculosis.
29	2-XII-15	Pasteurized at 140°F. for 20 minutes. Same as 27 and 28 plus 10 gal. of skim milk.	572A. 2-XII-15 Subcutaneous 573. 2-XII-15 Subcutaneous 574. 2-XII-15 Intramuscular	573 and 574 chloroformed 10-II-16. Negative for tuberculosis.
30	3-XII-15	Raw	575. 3-XII-15 Subcutaneous	575 and 576 chloroformed 11-II-16. Generalized tuberculosis.
31	3-XII-15	Same as 30, but clarified.	576. 3-XII-15 Intramuscular 577. 3-XII-15 Subcutaneous	577 died 30-I-16. Generalized tuberculosis.
32	3-XII-15	Pasteurized for 20 minutes at 141°F. and contained 400 gal. same as 30 and 31 and 90 gal. other milk.	578. 3-XII-15 Intramuscular 579. 3-XII-15 Subcutaneous 580. 3-XII-15 Intramuscular	578 chloroformed 15-II-16. Generalized tuberculosis. 579 and 580 chloroformed 10-II-16. Negative for tuberculosis.
33	4-XII-15	Raw	581. 4-XII-15 Subcutaneous	581 and 582 chloroformed 24-II-16. Generalized tuberculosis.
34	4-XII-15	Same as 33, but clarified.	582. 4-XII-15 Intramuscular 583. 3-XII-15 Subcutaneous	583 chloroformed 24-II-16. Generalized tuberculosis.
35	4-XII-15	Pasteurized for 20 minutes at 140°F. Contained 440 gal. same as 33 and 34 and 40 gal. other milk.	584. 3-XI-15 Intramuscular 585. 4-XII-15 Subcutaneous 586. 4-XII-15 Intramuscular	584 chloroformed 3-II-16. Generalized tuberculosis. 586 chloroformed 6-III-16; showed a small abscess at point of inoculation, but no tubercle bacilli were found and no reinoculations were made. Both these animals gave negative results to intradermal tuberculin test. 585 chloroformed 6-III-16. Negative for tuberculosis.

No. of Sample	Date Received	Nature of Milk	Guinea Pig Number and Date of Inoculation	Results and Other Remarks
*36	8-XII-15	Clarified	589. 8-XII-15 Subcutaneous	589 and 590 chloroformed 6-II-16. Generalized tuberculosis.
37	9-XII-15	Raw	593. 9-XII-15 Intramuscular	593 died 24-II-16; positive. Generalized tuberculosis.
**38	9-XII-15	Same as 37, but clarified.	594. 9-VII-15 Subcutaneous	594 chloroformed 26-II-16. Generalized tuberculosis.
			595. 9-VII-15 Subcutaneous	595 chloroformed 16-II-15. Generalized tuberculosis.
			596. 9-XII-15 Intramuscular	596 chloroformed 29-II-16. Generalized tuberculosis.
			597. 10-XII-15 Subcutaneous	597 died 26-II-15. Generalized tuberculosis.
39	10-XII-15	Raw	598. 10-XII-15 Intramuscular	598 died 24-II-16. Generalized tuberculosis.
40	10-XII-15	Same as 39, but pasteurized for 20 minutes at 140° F.	599. 10-XII-15 Intramuscular	599 chloroformed 7-III-16; showed lentil sized nodule at point of inoculation, containing yellowish pus. Inoculated guinea pig 697 on 7-III-16 and chloroformed on 15-IV-16. Negative for tuberculosis.
			600. 10-XII-15 Subcutaneous	600 chloroformed 7-III-16; abscess at point of inoculation. Inoculated guinea pig 695 7-III-16 and chloroformed 15-IV-16. Negative for tuberculosis.
41	11-XII-15	Raw	603. 11-XII-15 Subcutaneous	603 and 604 chloroformed 29-II-16. Generalized tuberculosis.
42	11-XII-15	Same as 41, but pasteurized for 20 minutes at 140° F.	604. 11-XII-15 Intramuscular 605. 11-XII-15 Subcutaneous 606. 11-XII-15 Intramuscular	605 and 606 chloroformed 29-III-16. Negative for tuberculosis.

*Three samples received on this date, but only the clarified sample was used. The raw milk received on this day was from different milking.

**Pasteurized sample not inoculated on account of temperature rising to 149° for eight minutes.

No. of Sample	Date Received	Nature of Milk	Guinea Pig Number and Date of Inoculation	Results and Other Remarks
43	23-XII-15	Raw	617. 23-XII-15 Intramuscular 618. 23-XII-15 Subcutaneous	617 died 3-I-16; not autopsied. 618 chloroformed 4-III-16. Generalized tuberculosis.
44	23-XII-15	Same as 43, but clarified.	619. 23-XII-15 Subcutaneous 620. 23-XII-15 Intramuscular	619 and 620 chloroformed 6-II-16. Generalized tuberculosis.
45	23-XII-15	Pasteurized for 20 minutes at 140°F. and contained 460 gal. Same as 43 and 44 and 40 gal. skim-milk.	621. 23-XII-15 Subcutaneous 622. 23-XII-15 Intramuscular	621 chloroformed 3-III-16. Negative for tuberculosis. 622 chloroformed 6-III-16; precutaneous glands enlarged; reinoculated 694 7-III-16; chloroformed 15-IV-16. Negative for tuberculosis.
46	24-XII-15	Raw	623. 24-XII-15 Subcutaneous 624. 24-XII-15 Intramuscular	623 chloroformed 29-II-16. Generalized tuberculosis. 624 chloroformed 29-II-16. Generalized tuberculosis.
47	24-XII-15	Same as 46, but clarified.	625. 24-XII-15 Intramuscular 626. 24-XII-15 Subcutaneous	625 and 626 chloroformed 29-II-16. Generalized tuberculosis.
48	24-XII-15	Pasteurized for 20 minutes at 140°F. and contained 160 gal. Same as 46 and 47 and 40 gal. skim-milk.	627. 24-XII-15 Intramuscular 628. 24-XII-15 Subcutaneous	627 and 628 chloroformed 1-III-16. Negative for tuberculosis.
49	27-XII-15	Raw	629. 24-XII-15 Subcutaneous 630. 27-XII-15 Intramuscular 631. 27-XII-15 Intramuscular 632. 27-XII-15 Subcutaneous	629 chloroformed 4-III-16; positive. Generalized tuberculosis. 630 died 28-XII-15; not autopsied. 631 killed by 1 c.c. tuberculin 27-I-16. Generalized tuberculosis. 632 died 30-XII-15; not autopsied.
50	27-XII-15	Same as 49, but clarified.		

No. of Sample	Date Received	Nature of Milk	Guinea Pig Number and Date of Inoculation	Results and Other Remarks
51	27-XII-15	Pasteurized, 460 gal. Same as 49 and 50 and 40 gal skim-milk. After 6 minutes at 140°F. 2 gal. cream had been added (cream probably pasteurized); then the whole kept at 140°F. for 14 min. longer. Addition of cream did not appreciably alter the temperature.	633. 27-XI-15 Subcutaneous	633 chloroformed 6-III-16. Negative for tuberculosis.
			634. 27-VII-15 Intramuscular	634 chloroformed 6-III-16; enlarged precural glands, reinoculated No. 693 7-III-16; chloroformed 15-IV-16. Negative for tuberculosis.
52	28-XII-15	Raw	638. 28-XII-15 Subcutaneous	638 and 639 chloroformed 4-III-16. Generalized tuberculosis.
53	28-XII-15	Same as 52, but clarified.	639. 28-XII-15 Intramuscular	640 and 641 chloroformed 4-III-16. Generalized tuberculosis.
54	28-XII-15	Pasteurized for 20 minutes at 140°F. and contained 460 gal. Same as 52 and 53 and 40 gal. skim-milk.	640. 28-XII-15 Subcutaneous	642 and 643 chloroformed 3-II-16; by mistake. Negative for tuberculosis.
			641. 28-XII-15 Intramuscular	
			642. 28-XII-15 Subcutaneous	
55	29-XII-15	Raw	643. 28-XII-15 Intramuscular	
			646. 29-XII-15 Subcutaneous	646 and 647 chloroformed 17-III-16 and 23-III-16 respectively. Generalized tuberculosis.
56	29-XII-15	Same as 55, but clarified.	647. 29-XII-15 Intramuscular	644 dead 5-III-16. Generalized tuberculosis.
57	29-XII-15	Same as 55 and 56. Pasteurized for 20 minutes at 140°F.	644. 29-XII-15 Subcutaneous	645 chloroformed 4-III-16. Generalized tuberculosis.
			645. 29-XII-15 Intramuscular	648 and 649 chloroformed 22-III-16. Negative for tuberculosis.
			648. 29-XII-15 Subcutaneous	
	29-XII-15		649. 29-XII-15 Intramuscular	

No. of Sample	Date Received	Nature of Milk	Guinea Pig Number and Date of Inoculation	Results and Other Remarks
58	30-XII-15	Raw	652. 30-XII-15 Subcutaneous	652 and 653 chloroformed 3-II-16; positive. Generalized tuberculosis. 650 and 651 chloroformed 6-III-16. Negative for tuberculosis.
59	30-XII-15	Pasteurized for 20 minutes at 140°F. and contained 360 gal. Same as 58 and 40 gal. of skim-milk.	653. 30-XII-15 Intramuscular	
			650. 30-XII-15 Intramuscular	
			651. 30-XII-15 Subcutaneous	
60	31-XII-15	Raw	654A. 31-XII-15 Subcutaneous 655A. 31-XII-15 Intramuscular	654A and 655A chloroformed 3-II-16; positive. Generalized tuberculosis. 656A and 657A chloroformed 22-III-16. Negative for tuberculosis.
61	31-XII-15	Same as No. 60. Pasteurized for 20 minutes at 140°F.	656A. 31-XII-15 Intramuscular 657A. 31-XII-15 Subcutaneous	

(Clarified milk received but not used since guinea pigs inoculated with clarified milk and posted to date all showed tuberculosis.)

After clarification fourteen samples of the same milk produced tuberculosis in all the inoculated guinea pigs in all but three cases. In one of these, No. 6 (same milk as sample 5 after clarification) both inoculated guinea pigs died of septicemia. From the other two samples (Nos. 22 and 50) one guinea pig in each case developed tuberculosis while the other died soon after inoculation.

After pasteurization twenty-three samples of the same milk (plus the required amount of milk or cream to standardize the vat as indicated in our table) failed to produce tuberculosis or cause death from inoculation in a single instance. Twelve of these were heated above 140° F. and held for a longer period than 20 minutes. The remaining 11 were definitely known to be heated to 140° F. and held for only 20 minutes.

The above findings indicate *first*, that pasteurization at 140° F. for 20 minutes kills tubercle bacilli in naturally infected milk. The pasteurization of milk from non-tuberculin-tested cows by heating it uniformly for 25 minutes at a temperature of 140° to 145° F., as provided for in the new California State Dairy Law, will render such milk free from tuberculous infection.

Second, that with a properly insulated tank in which the heating and holding are done in the same tank, while the milk is being constantly agitated, we were able to produce and hold the temperature of all the contained milk at the desired point and for the desired length of time.

Third, that clarification of milk naturally infected with tubercle bacilli fails to render it innocuous to guinea pigs.

A self-recording thermometer is necessary in a large plant to control the temperature of milk in the vats, and is essential for proper official supervision. The recording thermometer should frequently be checked with the actual temperature of the milk in the vat, and especially after placing each new record sheet in the case.

It has occurred to us that at least two conditions may arise in the process of pasteurization, such as used in this work, which would permit some of the milk to pass through the apparatus without being properly heated and this fact not be detected by the examination of the recording sheets. (a) After 140° F. has been reached and maintained for 10 to 15 minutes, milk or cream not previously pasteurized may be added to the vat for standardizing purposes without sufficiently affecting the temperature of such a large volume

of milk, to cause a noticeable decline on the recording sheet. (b) Unless the recording thermometer is placed at the top of the vat instead of the bottom, as is the regular practice, the exit valve may be opened soon after 140° is reached, and the length of time required to empty 500 gallons of milk will cause the thermometer to record a 20 minute period before the level of the milk drops below the mercury of the thermometer, thus permitting a large volume of the milk to be removed after being heated for less than 20 minutes.

Tubercle bacilli are not destroyed in milk samples preserved with one per cent. boric acid, and yet such preservation is sufficient to allow samples to be shipped considerable distances without their undergoing undesirable changes which interfere with laboratory examinations and guinea pig inoculations.

In two cases, 14 and 16, when we used 200 c.c. of 10% solution of antiformin to each 100 c.c. of milk, tuberculosis failed to develop in the inoculated guinea pigs (529, 530, 542 and 543), while the untreated milk produced tuberculosis in all (6) inoculated animals. In view of these findings together with the excellent results with 1% boric acid preservation we do not recommend the antiformin treatment of milk intended for guinea pig inoculation for the detection of tubercle bacilli.

LEGISLATION ON TICK ERADICATION IN LOUISIANA. The New Orleans *Times-Picayune* devotes some little space to the favorable comment of Dr. W. H. Dalrymple on the work done by the General Assembly in passing legislation which will help very materially in the tick eradication work in Louisiana. A statewide, compulsory, tick eradication law has been passed and signed by the Governor which is to come into effect not later than April, 1918. In the meantime the work goes right along, as the parishes are ready and the more remote sections will have time to get ready for systematic work. A quarantine law, a companion measure, prohibits the movement of cattle from any quarantined area into a tick-free one, or one in which systematic work is being conducted. The General Assembly and Dr. Dalrymple deserve high commendation for such service, which, in time, will materially increase the wealth and resources of the state,

THE PRACTICAL PART OF VETERINARY EDUCATION*

A. S. COOLEY, Columbus, Ohio.

I believe that all present heartily agree with Dr. Baker's statement that "hospital practice is as important in the veterinary curriculum as are the didactic courses." No veterinary pedagogue would today think of graduating students without the necessary clinical training, and the writer knows of no institution in which this is being neglected. When one realizes the very extensive field and many phases of veterinary work for which our colleges must now qualify students, it seems to me that the most practical part of our veterinary education to be desired, is that the curriculum possess balance. No longer can we qualify our graduates for practice alone, for with the marked advances in pathology, bacteriology, serum therapy and sanitation in the last decade, many new opportunities and positions are available to the well qualified veterinarian.

Compare the curricula of our best veterinary colleges of today with those of the leading institutions of ten and twenty years ago, and the comparison convinces one that our field is annually becoming more extensive as well as more attractive.

It seems desirable that I make direct reference to several of the more specific points in mind.

First. May I ask whether our students are getting sufficient instruction and laboratory work on the anatomy of the ox, dog and pig? In answering I desire to state that those of us in practice have never known too much about the anatomy of the horse. What, then, is the situation in this connection with the men engaged in federal, state and municipal sanitary work? Ninety percent of their anatomical work has been on the horse with but a limited time on the other animals. Many of these men have not touched a horse since graduation. Are these men as well qualified, therefore, for diagnosis either acute or post mortem, as is desirable?

Secondly. May I ask whether the courses in pathology in our institutions are as well balanced as they should be? The writer is hardly qualified to answer his own question, but desires to state that his contact with the recent graduates of two of our stronger

*Presented at the meeting of the Association of the Veterinary Faculties and State Examining Boards of North America, September, 1915, Oakland, Cal.

veterinary colleges, has pointed out that they are very accurate in the microscopic diagnosis of pathological tissues, but are more or less helpless in recognizing these same conditions in gross pathology. More practical results should be sought, in my judgment, and this condition be obviated.

In closing I desire to state my views on the number of sessions and the length of each, in veterinary education. In so doing I must take friendly exception to certain of Dr. Baker's statements. It seems highly desirable that if possible the graduate veterinarian of today should have passed through four sessions of nine months each, completing a curriculum designed to give him a foundation in all fields of veterinary work. The writer does not believe that veterinary education any more than medicine, law or engineering, should be arranged to accommodate the financial condition of a percentage of our students, nor do I believe that our students should return home to "quack" for fifty per cent. of each year. They are really qualified for no line of practice until after the completion of the junior year, and, even then, they should have the association of a good practitioner.

The four sessions of nine months each would, I am sure, temporarily reduce the number of students, but it is my observation that there is no scarcity of veterinarians anywhere.

The most practical part of veterinary education appears to me to be *balance*, with the quality rather than the quantity of our graduates being the end sought.

VALIDITY OF THE FEDERAL NARCOTIC LAW. The Supreme Court has decided that possession of the affected narcotic drugs is only unlawful when had by persons required to register by the provisions of Section 1, and who have not so registered. In other words, possession by the consumer, by any person who does not deal in these drugs and who is not required to register, is not unlawful. This decision weakens to a considerable extent the act, and no doubt additional legislation will be devised to remedy this defect.

The twenty-fifth annual meeting of the Missouri Veterinary Medical Association was held at Neosho, Mo., July 27 and 28. The program contained numerous interesting papers and discussions.

CLINICAL AND CASE REPORTS

"Knowledge is born in laboratories and in the experience of the thoughtful. It develops form in the journals and 'when dead it is decently buried in books'."

ODD OBSTETRICAL CASES

JAMES A. WAUGH, Pittsburgh, Pa.

Case No. 1 was a white poodle bitch, age 3 years, weight seven pounds, pregnant full time. Labor began at 9 a. m., presentation of both fore feet in vulva; further progress unsatisfactory, and I was called at 10 p. m. Digital examination revealed fore limbs lodged in vaginal canal, ribs of chest wall could be felt indicating body presenting transversely, and impossible to deliver in the ordinary way. I deemed it expedient to delay operation until next morning, and had the patient brought to my office. Laparotomy revealed a bicornual pregnancy with head and neck curved forward in one cornu, fore feet presenting through os uteri, and body bent and lodged in the other cornu, thus forming a sort of letter U-shaped condition of fetus located in both horns of the uterus. Performed hysterectomy, removing fetus; saved uterus and horns; placed ligature around vagina. Applied surgical dressing and gave suitable internal treatment. Patient seemingly did well for about 24 hours, but finally succumbed to surgical shock. She was an old lady's house pet, idle, and over-fat; lacked exercise and condition. Sent specimen with surrounding envelopes to the Veterinary School of University of Pennsylvania. Williams' "Obstetrical Operations" describes and discusses bicornual pregnancies.

Case No. 2. Dairyman called me at 10 p. m. one rainy night last winter to see a fresh cow with retained placenta; calf born at 9 a. m. and playing about the place; dam prostrate and extremities extended; thin, and unable to arise; aged, and body poorly nourished. Gave stimulants and tonics, left treatment, and advised delaying further intervention until daylight. Examination on the following day revealed another calf retained in the uterus with head bent back on one side of neck, thus obstructing delivery. Cow still prostrate and unable to arise. Block and tackle were used to elevate hind extremities about three feet, then with arm and hand introduced, I pushed body of fetus forward, while a strong man pushed his arm and hand alongside mine, thus getting his hand in the mouth and extending the head, straightening the neck that way; applied

small ropes on fore feet and hook in lower jaw, and effected delivery in a short time. Douched uterus with permanganate of potash solution; gave suitable internal treatment at proper intervals, but patient remained prostrate and succumbed in 48 hours. Moral—examine all cases carefully in due time. Williams says, "Deviations of the extremities of twins are subject to the same rules as those of single pregnancies".

FISTULOUS WITHERS IN THE HORSE AND ITS OPERATIVE TREATMENT

R. MAYER

Instruments for the removal of necrotic spinous processes are wanting. The Hauptner bone forceps cannot be used in most cases. For lack of better equipment I resorted to the use of the hoof knife, hoof forceps and key-hole saw to sufficiently open the skin and the necrotic parts to permit free flow of the secretion and relaxation of the tissues. In some cases healing occurs, when only the uppermost part of the spinous process is involved.

The use of the hoof knife in the removal of necrotic bone has this disadvantage, that the remaining stump of the spinous process may be loosened; and often the ligamentum interspinosum is torn loose. This leads to further formation of pus pockets clear to the bodies of the vertebrae, and it is only a question of time when they become affected. I have seen cases in which the pathological process had penetrated to the cord, resulting in unexpected paralysis and death.

In the use of the hoof forceps,—when there is any success at all in removing pieces of bone,—the ends of the processes are crushed, leading to further necrosis.

Least dangerous is the keyhole saw (fret saw, graft saw) because it makes a comparatively smooth cut. Its use does not entirely exclude the tearing and the shock to the inflamed tissues above described. Aside from this, the saw can be used only when the withers are high; there must be a free operative field, freedom of movement, and large incisions. Consequences are, large gaping wounds and long period of healing.

As the result of these experiences it has become a common

practice to let the diseased bone and ligament extrude themselves. The drainage of pus is looked after, the rest is left to nature. The results of this method are the above mentioned severe cases of vertebral caries; oftener there is subfascial phlegmon, the therapy of which is still a problem.

With the use of instruments which I have constructed and tried in 150 cases I believe that a middle course in the surgical technic is possible. First, the large gaping wounds are avoided; second, necrotic tissue is removed without danger. This method is followed by a rapid healing and does not necessitate the frequent after-treatments.

I have found that the radical operation,—the bold removal of altered tissues with sharp instruments,—results in a larger percentage of cures than the more conservative, nursing treatment on the natural line of demarcation.

If the losses of skin have been large, I use Forceps No. 1. This is used mainly to cut the loose necrotic spinous process. It is brought down vertically from above and closed with a slow powerful grip in order to make a smooth cut. If the ligaments were not cut by the forceps, this is not accomplished by using the forceps with leverage, but they are cut by scissors.

The cut with the forceps is to be made under the necrotic parts, so that thoroughly healthy bone is cut. (This is a straight pair of forceps, the jaws and handles lying in the same plane. The cutting edges are placed as in any ordinary forceps; the edges and the screw at the joint of the forceps are parallel).

Forceps No. 2 is so constructed as not to destroy areas of skin. The plane of the jaws makes an angle of about 30 degrees with that of the handles. On account of this bend it may be introduced into a constricted fistula, pushed quite far to the front or rear without much injury to the skin or musculature. As before, after cutting the spinous process, any adherent muscle or ligament shreds must be removed with scissors. The shanks of the scissors should be somewhat long, to facilitate work.

To determine which of the spinous processes are affected, palpation is best. All parts that feel rough must be removed.

The second, not less important part, consists in the drainage of the resultant cavity. Particular care must be taken that the drainage begin at the deepest part, close to the cut process. If the pus

has not travelled down behind the scapula, the drainage canal may be made with a seton needle.

To lay the drainage tube when there has been deep sinking of pus, I use instrument No. 3 (a needle, with slight double curvature, 50—60 cm. long). With this length of the needle it is in every case possible to make an opening ventral to the scapula, and either anterior or posterior to it. For drainage a piece of fenestrated rubber tube (not soft) is used. This is introduced into the fistula with the aid of the needle, blunt end foremost. To prevent the tube from sliding through the fistula, a small piece of wood is introduced into the upper end of the tube.

Drainage with heavy walled tubing of large bore is absolutely necessary. Such good drainage is never obtained by the use of gauze bandages drawn through the fistula. The rubber tube is to remain as long as possible, at least three weeks in severe cases. Irrigation with disinfectant fluids during the first eight days is better omitted. Only the wound is cleaned, treated with Lugol solution; and the cavity filled with cotton sponges drenched in Lugol solution. Sometimes the rubber tube must be opened by the cautious introduction of the blunt end of the seton needle. After the first eight days, the rubber tube may be irrigated; there is then little danger of the fluid infiltrating the surrounding tissues.

I have obtained excellent results with this treatment. The instruments are made by Hauptner, in Berlin.—*Zeitschrift für Veterinärkunde*, xxvii, 321-324, 1915.

BECK.

TRIPLETS

H. B. BRADY, Lancaster, Pa.

Sometime ago, a cow, a few miles away from the city, gave birth to three heifer calves. They grew up into three fine cows and each has given birth to calves. They are all standing dry now ready to become fresh at any time. They are so much alike that they cannot be told apart except for the fact that one wears a blue ribbon, another a red ribbon and the third none. This seems to be the only way to identify them. The mother of the triplets is still living and doing nicely.

ABSTRACTS FROM RECENT LITERATURE

BROKEN BACK. P. G. Bond, M.R.C.V.S. *Veterinary Record*. A big gun wagon army mare, seven years old, sound and good worker, had been 16 months in the service. One day marching near side wheeler, in turning around, she slipped, fell and went down on her hind quarters, spreading the legs. She got up, was lame and stiff behind. She was walked home, three miles, put in her stall and fed. The next morning she still showed more stiffness. On trying to move, she swayed for a time and then went down. She got up with difficulty and had to be helped but she went down again. Diagnosis of paralysis was made. There was loss of sensibility to the pricks of pins and the animal struggled much with her fore feet. She was destroyed. The post mortem showed the 9th vertebra of the dorsal region completely shattered and broken into five pieces with the spinous process separated. The 8th vertebra showed also a repaired fracture.

LIAUTARD.

TREATMENT OF MOIST ECZEMAS IN THE HORSE. Zaruba, Karl. *Tierärztliches Zentralblatt*, Vol. 39, pp. 52 53, 1916. The various forms of eczema are a frequent trouble in horses in the military field. To these should be added burns, frostbites and various other corrosions of the extremities.

In the clinic and in practice a large variety of therapeutic agents are at the disposal of the veterinarian. But in the field, conditions are different. The veterinary medical depots are none too well supplied and the veterinarian is obliged to use a restricted number of therapeutics of known value.

As the result of extensive field experience, I propose the use of the following liniment, which seemed to possess an almost specific healing action in an astonishingly large number of cases of moist eczema.

My supply of medicaments was limited, tar liniment and pyoktanin happened to be plentiful. Bearing in mind that the old school treated eczemas with tar and sulfur ointments, I used applications of Vienna tar liniment to which there had been added an equal volume of 2½% aqueous solution of pyoktanin. Following is the prescription:

R

Pyoktanin	15.0	or $\frac{3}{4}$ ss.
Pic. liqu.		
Sulf. subl. aa.	100.0.....	$\frac{3}{4}$ iv.
Sapo viridis		
Spir. denat. aa.	200.0.....	$\frac{3}{4}$ viii.
Aq. font.	600.0.....	$\frac{3}{4}$ xxiv.

M. D. S. Liniment.

Cotton pads drenched with the above medicament were applied to the skin, properly cleaned, and tied in place with bandages. Renew daily.

When applied to a horse with an aggravated case of eczema of both hind feet, there was striking improvement in 2 days and complete healing in 10 days. The same remedy was tried in numerous cases of burn and frostbite with excellent results.

(Note by the Abstractor—Pyoktanin is methyl violet; not methylene blue).

BEGG.

BOVINE TUBERCULOSIS FIGHT. *Journal of the Outdoor Life*, Vol. XIII, No. 6, June 1916, p. 185. Protection of the public from bovine tuberculosis is dependent on the women of Iowa and their ability to bring about necessary legislation for clean milk from tested cows, inspection, and restriction of importation and slaughter of diseased animals. This was the consensus of opinion at the conference of representatives from the Iowa Meat Packers' Association; W. F. Clowes and Dr. John H. Peck, of the Iowa Anti-tuberculosis Association; A. B. Holbert, of Greeley, Iowa, a stock raiser and farmer; H. S. Hollingsworth, secretary of the Associated Charities; and Dr. Gibson, state veterinarian.

The conference was called to discuss future state legislation to check the spread of tuberculosis by milk and meat. Iowa is among the few states which have a high percentage of tuberculosis among animals. Of the 1,500,000 dairy cows in the state 15 per cent are said to be tubercular. Of the 2,500,000 cattle slaughtered annually in the state 10 per cent are infected and the percentage of infected hogs, numbering 10,000,000, is estimated as 20 per cent. The Iowa Packers' Association has appointed a committee to co-operate with the Iowa Antituberculosis Association in a state-wide campaign for laws which will regulate and restrict the slaughter of animals and provide for government test of all animals slaughtered.

REICHEL.

HYPERTROPHY—DILATION OF THE HEART. J. B. Wolstenholme, F.R.C.V.S. *Veterinary Journal*. After an injury of the near hock, this heavy cart gelding, had acute lymphangitis for which he was treated. After a short time of light work he was laid up again, his leg was still swollen but no lameness was present. After a week he had labored breathing, sweating, and then began a series of symptoms which varied but lasted till the horse was destroyed after two weeks. During the time of his illness, the temperature was about 101°F. The pulse varying between 68 and 80, being sometimes very difficult to detect and almost imperceptible at the jaw or the elbow. There was a marked jugular pulse, auscultation of the left chest gave a loud rasping sound, loud palpitation sounds like a bumping against the ribs. All the visible veins were engorged and prominent. There was edema beneath the breast. The pulse taken at the posterior aorta was 72 to 80 and very irregular. Postmortem: thoracic and abdominal viscera pallid. Straw colored fluid in pericardium. Heart enormously enlarged and weighing 16 lbs.

LIAUTARD.

STREPTOCOCCUS PNEUMONIA IN CATTLE. Dr. Hasenkamp and Dr. Fürstenau, Münster, i. W. *Arch. f. wissenschaftl. u. prakt. Tierheilk.*, 40, Bd., 4 u 5 Heft. Abstracted from *Berl. Tier. Woch.* No. 6, XXXII, Feb. 10, 1916. Authors have frequently had the opportunity to find large numbers of streptococci in microscopic examination of lung expectoration of suspected cattle. The clinical suspicion of tuberculosis of the lungs was confirmed by repeated microscopic examinations of the mucus or through inoculation. It was highly supposed that the streptococci have a specific pathogenic effect. With the help of two histories, Hasenkamp and Fürstenau have been able to make a careful observation.

The usual lung material was examined bacteriologically and streptococci found which were pathogenic to rabbits, guinea pigs and white mice upon transmission. In conclusion according to the pathological lung findings it should give a primary streptococci pneumonia, the differential diagnosis in reference to confusion as to tuberculosis of the lungs is unimportant.

Abstracted by J. SCHMIDT. Translated by REICHEL.

THE BACTERIA OF MILK FRESHLY DRAWN FROM NORMAL UDDERS. Alice C. Evans. *Jour. Infec. Dis.*, Vol. XVIII (1916), p. 437. During the early years of the science of bacteriology it was supposed that milk drawn under aseptic precautions from a cow's udder was sterile. Schulz's was the earliest recorded work to show that the first milk drawn contained large numbers of bacteria. The work of Moore and Ward definitely settled the question that the normal udder harbors bacteria and that the milk may become contaminated as soon as secreted.

Of particular interest to veterinarians is the work the author did with *B. abortus*. If milk samples are plated out on serum agar and incubated for several days the organisms can be obtained without difficulty. The following table gives the results.

Frequency of the *Bacillus abortus* Group in Freshly Drawn Milk.

Dairy	Number of samples examined	Number of samples from which <i>B. abortus</i> was isolated	Percentage of samples from which <i>B. abortus</i> was isolated	Lowest and highest numbers of <i>B. abortus</i> per c.c. in the samples of milk
1	55	9	16.4	10 50,000
2	40	2	5.0	3,200 4,000
3	28	7	25.0	180 680
4	32	8	25.0	50 3,000
5	37	19	51.4	40 7,000

This table shows that *B. abortus* occurs rather commonly in milk. "Altogether, cultures were isolated from 45, or 23.4% of the 192 samples studied".

As a result of careful experiments it was shown that *B. abortus* may be the cause of bad odors and flavors in ripened cream. Two bottles of certified milk were purchased in the open market, kept at room temperature for six hours and then plated. "About 28,000 of the abortion bacilli were shown to be present in the cream layer of one sample and about 1900 in the cream layer of the other sample. In both samples the number of *B. abortus* was about 25% of the whole number of bacteria. The abortion bacilli can, therefore, be demonstrated in mixed milk".

The following table is self explanatory.

Cow	Quarter	First Examination		Time between 1st and 2nd examinations	Second Examination	
		Total Bac- terial count per c.c.	Total <i>B.</i> <i>abortus</i> per c.c.		Total bac- terial count per c.c.	Total <i>B.</i> <i>abortus</i> per c.c.
14	RB	750	Estimation impossible	19 months	230	None
18	RF	130	50	13 "	50	None
201	RF	50,000	50,000	13 "	10,000	10,000
204	RF	5,600	5,000	13 "	850	850

As a result of the work the author gives the following conclusions:

"It appears from the study here reported that there is a definite udder flora comprising bacteria which belong to parasitic types. It is not surprising that the majority of udder bacteria should be of the same type as those common on the skin and mucous membrane of man and animals. The majority of the staphylococci on the skin are of the non-virulent variety which fails to produce pigment and fails to ferment mannite. But pathogenic varieties also are found on the skin, where they ordinarily cause no trouble. Similarly, the majority of the staphylococci of the udder are non-virulent, but varieties which are capable of causing death when inoculated into experimental animals occasionally establish themselves in healthy udders. Whatever the variety may be, conditions in the udder are favorable to multiplication, and frequently large numbers are eliminated in the milk.

"The pathogenic properties of the streptococci and bacilli common in milk when it leaves the udder are not discussed in this paper, but they, also, are parasitic in their nature.

"When a bacterial culture is tested for its pathogenic properties, the body tissues and fluids are exposed directly to the toxins of the culture in question. When organisms enter into the digestive tract with the food the circumstances are different, for the body tissues and fluids are protected by the mucous membranes against the ravages of the bacteria that enter with the food. Therefore it cannot be assumed that bacteria which are pathogenic to inoculated laboratory animals would be injurious to human beings when present in the milk consumed. It is a subject worthy of investigation. But since the bacteria of the udder are parasitic in their nature, and since pathogenic varieties are sometimes eliminated in considerable numbers from healthy udders, the data here reported add evidence to the growing conviction that all milk is safer for consumption after it has been pasteurized".

C. P. FITCH,

DEATH FROM LIGHTNING STROKE. H. A. Reid, F. R. C. V. S. *Veterinary Journal*. A brief but severe thunder storm killed two cows and several others were affected. Post mortems were made. There was no outward indication of any injury, except in one on the right ear where there was a small hole like one which might be produced by a high velocity bullet. The venous system showed a very marked engorgement. The jugulars standing out as if injected and uncoagulated blood escaped freely when they were incised. Rigor mortis did not exist, the limbs were pendulous and easily bent at the joints. The whole of the muscular tissue of the neck and fore limbs was congested and blackened. The tendinous portion showed numerous hemorrhages, which were not present on the serous. The heart appeared dilated and filled with partially clotted blood. The abomasum mucosa was slightly inflamed. The liver was soft and very friable. On one of the cows the current had been received in the region of the jaw. The muscles in that region were swollen and discolored. The other cows seemed to have recovered from the shock or fright they had received. LIAUTARD.



RAPIDLY FATAL RESULTS OF BEE STINGS IN A HORSE. Kütke *Zeitschrift für Veterinärkunde*, Vol. 27, pp. 329, 330, 1915. A horse standing near a bee hive, was stung by a large number of bees. The bees were finally driven off by rubbing the horse with vinegar. Her entire body was covered with bee stings. There was profuse sweating. Conjunctiva dark red; pulse, very weak, 90 per minute. Respiration spasmodic, 40 per minute, groaning. Defecation and urination were painful. The feces soon became watery. Vaginal mucous membrane strongly reddened.

The movements of the horse were peculiar; frequently throwing herself. The animal died in 1½ hours. Treatment consisted of applications of Burow's Solution (aluminium acetate) and subcutaneously, camphor oil and morphine. Unfortunately a post-mortem could not be held.

Another horse stung by bees made a slow recovery. Treatment consisted of cloths soaked in aluminum acetate solution applied externally; internally large doses of alcohol, and for heart weakness, digitalin and camphor were administered. See also Jour. A. V. M. A. p. 413, June, 1916. BERG.

CONTRIBUTION TO THE DIAGNOSIS OF GLANDERS IN MEN. Dr. E. Gildemeister and Dr. Jahn Posen. *Berl. Klin. Woch.* 1915, Nr. 24, S. 627-630. Abstracted from *Berl. Tier. Woch. No. 30, July 29, 1915, XXXI*. The authors have had within a short time the opportunity to observe three cases of glanders in men. It appeared interesting to bring serological investigations together with bacteriological studies at the same time. Controls comprising a certain number of healthy individuals and individuals with other diseases were studied. The results can be summarized as follows:

1. In three cases of glanders in man the serological methods of investigation, agglutination, complement fixation and conglutination reaction have proved to be valuable diagnostic aids.

2. It is recommended in every case of glanders in man together with the bacteriological demonstration of glanders bacilli the testing of the suspected serum with the aid of the agglutination reaction and complement fixation method. In place of the complement fixation method the conglutination reaction can be employed.

In the agglutination test attention is to be given that agglutination of 1-100 and 1-200 should not be considered diagnostic, 1-400 suspected glanders and 1-800 as strongly positive.

Abstracted by SUSTMANN. Translation by REICHEL.

THREE CASES OF TUMOR OF THE SMALL INTESTINAL WALL AS IMPACTION COLIC IN THE HORSE. E. Fröhner. *Monatshette für Praktische Tierheilkunde*; Vol. 27, pp. 103-104, 1916. The usual impactions of the small intestine are caused by fecal stasis or a cicatricial stricture of the ileum, when they are not caused by changes in position (volvulus, incarceration, lipoma pendulans, etc.) Less frequently, tumors in the wall of the small intestine are the cause of impaction. Generally these tumors cannot be diagnosed during life. Usually only the diagnosis of impaction of the small intestine can be made. In only one of the three cases tumor was to be suspected because of the peculiar results of rectal examination.

1. Carcinoma of the Small Intestine. Brown gelding, with a clinical picture of simple impaction of the small intestine. On rectal examination; in front of the pelvic inlet a crooked portion of the small intestine could be felt, which was round, as stout as an arm, long, and with the consistence of a sack

filled with wet sand. One of the ends terminated abruptly. At this end the contents of the tightly filled intestine were most closely packed together, so that the inserted hand could scarcely make an impression with the finger. At this same end, a boil-like swelling, as large as a walnut, could be felt. Symptoms of distention of the stomach soon appeared, i. e., belching, vomiting through the nostrils, and the horse suddenly died in spite of treatment on the same day. On autopsy an adenocarcinoma, as large as a hen's egg, was found in the wall of the jejunum, which was the cause of the impaction of the jejunum at the same place where the boil-like swelling as large as a walnut was felt on rectal examination. In front of the carcinoma, there was a mass 80 cm. long, consisting of almost dry, compressed masses of food.

2. Sarcoma of the Small Intestine. Brown gelding, to be treated for impaction of the small intestine. Rectal examination, negative. Died two hours after arrival; clinical picture, rupture of the stomach. On autopsy, the cause of the impaction was found to be a fibrosarcoma as large as an apple on the wall of the jejunum, with a secondary rupture of the stomach. The lumen of the small intestine was constricted by the fibrosarcoma; in front of the constriction the small intestine was tightly filled with fluid from its origin down to 4 meters past Vater's ampulla.

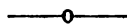
3. Myoma of the Small Intestine. Brown gelding, to be treated for impaction of the small intestine, died 12 hours after arrival. Rectal examination disclosed two parallel loops of the small intestine, distended with gas and lying anterior to the pelvic floor. On autopsy, the cause of the impaction was found to be a myoma, as large as a duck egg, in the wall of the jejunum. In front of the tumor there was a dried fecal mass 14 cm. long, in which region the intestinal mucosa was hemorrhagic and inflamed.

BERG.

PURPURA HEMORRHAGIC. J. B. Wolstenholme, F.R.C.V.S. *Veterinary Journal*. Record of a six years old Shire gelding which received a severe wound over the pyramidal process of the off hind foot. Suppuration was abundant and of a bad nature. There was much pain. Treated with antiseptic fomentations and boracic wool poultices, the process went on satisfactorily. After three weeks time, purpura developed. Pulse became weak and quick. Characteristic swellings took place on the four legs, the face, the

breast and beneath the abdomen. Petechiae were present on the visible mucous membranes. The temperature varied between 101.6° and 102° being the highest on the fifth day of the disease. The weakness of the horse was such that he had to be placed in slings. He was convalescent and in fair health after three weeks.

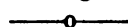
LIAUTARD.



JOHNE'S DISEASE, OR WHAT, IN THE DOG? Henry B. Eve, M. R.C.V.S. *Veterinary Journal*. A pedigreed brindle bull dog was in poor condition. He appeared unthrifty, tucked up in the flank, his appetite was unimpaired and worms were suspected as the cause of the condition. The coat was staring, itchy and had an odor like "urinous eczema". The nose was moist, eyes bright but sunken. There was edematous swelling in the intermaxillary space and under the sternum. Although there was great thirst, there was no fever. Feces were frothy and contained undigested particles of food. There was intermittent diarrhea, recurring every 3 or 4 weeks. The pulse was weak and fast. There was a slight cough. The dog had a straddling gait, with back arched and he urinated like a female. Blood stained mucus existed in the feces. Nothing apparently abnormal by auscultation but there was general dullness on percussion. Treatment: The dog was isolated and treated for worms first and then internally received diarrhea tablet triturates (Parke, Davis and Co.) opium, camphor, ipecac and lead acetate. Afterwards lactated pepsin, creosote, and petroleum emulsion and finally stomachics and tonics. His diet consisted of: glaxo, barley water, raw meat, tripe, codliver oil and rice.

The dog improved but the author thinks this is only temporary and that the trouble will return again.

LIAUTARD.



THE THEORY OF THE FREE-MARTIN. Frank R. Lillie. *Science*, Vol. XLIII, No. 1113, April 28, 1916, p. 611. "The term free-martin is applied to the female of heterosexual twins of cattle. The recorded experience of breeders from ancient times to the present has been that such females are usually barren, though cases of normal fertility are recorded. This presents an unconformable case in twinning and sex-determination, and it has consequently been the cause of much speculation."

The author refers extensively to the abstract in "Science Vol. XLIII, p. 177, February 4, 1916" on Leon J. Cole's paper before

the American Society of Zoologists on "Twinning in Cattle with Special Reference to the Free-Martin".

"There is space only for a statement of the conclusions drawn from a study of these cases, and of normal pregnancies. In cattle a twin pregnancy is almost always a result of the fertilization of an ovum from each ovary; development begins separately in each horn of the uterus. The rapidly elongating ova meet and fuse in the small body of the uterus at some time between the 10 mm. and the 20 mm. stage. The blood vessels from each side then anastomose in the connecting part of the chorion; a particularly wide arterial anastomosis develops, so that either fetus can be injected from the other. The arterial circulation of each also overlaps the venous territory of the other, so that a constant interchange of blood takes place. If both are males or both are females no harm results from this; but if one is male and the other female, the reproductive system of the female is largely suppressed, and certain male organs even develop in the female. This is unquestionably to be interpreted as a case of hormone action. It is not yet determined whether the invariable result of sterilization of the female at the expense of the male is due to more precocious development of the male hormones, or to a certain natural dominance of male over female hormones."

REICHEL.

FRACTURE OF THE PARIETAL BONE IN A DOG. J. W. H. *Veterinary Record*. A well bred collie was struck by a light engine and was carried home. The next morning he was visited by the author who noticed a small incised wound in the sagittal direction behind the mid point of the left frontal crest. There was much swelling all round the wound, which was dry and caked with mud. The dog was unconscious, with eyes open, corneal reflex absent, and marked internal strabismus of both eyes. Opisthotonos spasms occurred now and then and there were continuous choreiform movements of the head. The dog barked and moaned frequently. There was rhythmic pawing of the left fore and hind limbs. The right legs seemed paralyzed. Pulse was frequent and respiration accelerated. Temperature 99.7°F. After cleaning the wound the examination revealed a fracture of the left parietal bone without displacement, subdural hemorrhage was suspected. Iodine ointment was applied to the wound and morphine given subcutaneously. This seemed to cause some improvement and hopes for recovery were entertained. Three-quarters of a pint of a 5%

salt solution was injected by rectum. Atropine 1/50th of a grain was injected subcutaneously. The second day after the accident the patient regained consciousness, his eyes were normal and the pulse was good, temperature 100° F. Paralysis was improving and gradually with iodide of potassium given for a week and after arsenic and quinine, recovery was complete with the exception of occasional choreic twitching of the head. LIAUTARD.

ERADICATION OF TUBERCULOUS CATTLE FROM MILCH HERDS. A. V. Tracy, D.V.S. *The Public Health Journal*, Feb., 1916. In 1911 the city of Sherbrooke, Que., passed a by-law compelling the removal of all cattle from herds supplying the city with milk, which reacted to the tuberculin test. Of 650 head, 13% reacted; these were removed and replaced by others. A second test of these 8 months later gave 1½% of reactors. A third test 18 months later gave only 4 reactors out of 674 head, a percentage of ½. Compensation for the destroyed cattle is not advisable, as it would tend to promote carelessness on the part of the owner. The following regulations are important: Window lighting equal to one-tenth the area of the stable floors, lime washing of interior twice yearly, cleaning and grooming of cattle, covered pails, sterilization of milk utensils, removal of manure and the erection of special buildings for the handling and storing of milk. The best temperature is 50 degrees F. in a well ventilated stable. REICHEL.

CANCER OF THE TAIL. *Recueil de Med. Vet.* Prof. G. Moussu of Alfort has recently published a case of cancer of the tail in a cow in which the histological examination revealed a typical epithelium in which the epithelial tissue, while it formed the predominating element in the mass, contained also bony sarcomatous elements and others which made the whole a true heteroplastic tumor, which was impossible to classify.

The cancer was in an aged cow, which when presented to him showed in the middle of the tail, a large round tumor, spreading on its borders, so as to entirely surround the lateral parts of the caudal appendage. The external posterior surface was still covered with skin, coated with hairs, but the anterior surface was ulcerated and with several fistulous tracts, running in its depth, and giving escape to a bloody, purulent, grayish discharge having a repulsive odor. The growth on palpation gave the sensation of semi-fluctuation. The lower part of this tail seemed intact, not inflamed or even edema-

tous. The upper segment of the organ was much enlarged and infiltrated and inflamed. Around the anus in the ischial fossa, there was a small tumor, a diseased anal lymphatic gland. Rectal examination showed that generalization had not extended to the glands or organs of the pelvic cavity.

Amputation of the tail was performed for experiment and observations of generalization.

Nothing abnormal occurred until 15 or 20 days after when the left rump began to swell and then rectal examination showed a marked bulging of the ischiatic ligament. The swelling of the rump fluctuated and was punctured over the trochanterian summit, when a flow of sanious, gray-reddish, odorless fluid escaped with pieces of necrosed tissue. Then the right anal gland underwent suppuration. Ultimately the animal was destroyed. At post-mortem it was found that the generalization had not spread further than the pelvis, that a large purulent collection had formed through the left gluteal muscles and that the sublumbar lymphatic glands were involved. Certainly the generalization would have extended had the animal been allowed to live longer.

LIAUTARD.

DESTRUCTION OF DISEASED ANIMALS TO PROTECT PUBLIC HEALTH. (Durand et al. vs. Dyson et al. (Ill.) 111 N.E.R., 143). *Jour. of the Amer. Med. Assoc.*, Vol. LXVI, No. 13, March 25, 1916, p. 981. The Supreme Court of Illinois, in affirming a decree in favor of the defendants, the state veterinarian and the members of the state board of live stock commissioners, holds that they and their agents and employees should not be enjoined against slaughtering, in accordance with the statute, a herd of cattle afflicted with hoof and mouth disease. The court says that cattle afflicted with a dangerous and contagious disease are public nuisances as defined by the common law, and under the common law such a nuisance could not be legalized because it invaded the peace and safety of the people. Prevention of the spreading of dangerous diseases among cattle is now universally recognized in this country as within the domain of the police power, as it is so essential to the public safety and health. It is also now generally recognized that where the disease among cattle is so very dangerous and of so contagious or infectious a character as to be communicable to human beings through the consumption of the flesh or milk of such animals as have the disease, as the foot-and-mouth disease is generally considered

to be, legislatures may, and should, confer on boards or commissions the power to destroy animals afflicted with such a disease when thought to be necessary to public safety. A Massachusetts case upholds a statute authorizing summary proceedings to kill horses with the glanders. Proceedings for the destruction of property in many cases must necessarily be summary and without a previous trial or hearing. It would certainly not be contended by any one that a hearing ought to be had before demolishing a building in the path of a conflagration that was rapidly destroying a city, in case of the isolation and confinement of a person afflicted with smallpox or with the bubonic plague, or before the destruction of a dog suffering with rabies. In some cases hearings may be reasonably had before the destruction of property, but when the question is one regarding the destruction of animals or food which is not only unfit for human use, but may be fatal to those who use it, the emergency is such that the legislature should have the entire disposition of the matter without being subject to being reviewed and its acts declared void by the courts.

REICHEL.

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INGUINAL TRAUMATIC HERNIA IN A 15 MONTHS COLT—BILATERAL CASTRATION—RECOVERY. Mr. E. Jacquot. *Rec. de Medic. Veter.* A well built colt jumped over a plowing machine and the shaft penetrated the left inguinal region. There was no cutaneous wound but a tumor appeared and grew gradually during the following days. The colt had colics more or less severe. Treated first by an outsider the tumor became hard, had an ovoid regular shape and was as big as an adult's head. It extended in the inguinal canal by a very hard peduncle as big as the fist. It was reducible. The right testicle was in normal position but the left was not found. Diagnosis of chronic inguinal hernia was made in which the trauma had only dilated the inguinal canal and permitted the entrance of the intestines through the vaginal wall. After preparation an operation was performed. Incision on the enlargement, dissection, liberation of the hernial sac as far as the peduncle, reduction of the hernia and ligation of the sac by transfixion with half a circular and a full circular turn. This done, the left testicle was looked for and found situated high up behind the peduncle, free from the hernial sac. The neck of the hernial sac and the left testicle with the vaginal were secured in one large clamp and the interference closed by castration of the right testicle in the usual way. Recovery was uneventful.

LIAUTARD.

PROCEEDINGS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

(Continued from page 557)

Oakland, Calif., September 2, 1915.

The seventh business session of the fifty-second stated meeting of the American Veterinary Medical Association was called to order by the President, Clarence J. Marshall, in accordance with the printed program, at 7:30 o'clock P. M., on said day.

PRESIDENT MARSHALL: Gentlemen, with the exception that there may be a report of the executive committee—something further in reference to colleges—the only business which we have for this evening is the election of officers. We will first hear the recommendation of the executive committee.

DR. MAYO: It is moved by the executive committee, and that committee recommends to the association, that the association provide a stenographer for the Association of College Faculties and Examining Boards and that the proceedings of the college faculties and examining boards be referred to the committee on journal for their consideration and publication of such portions as they may deem advisable.

DR. KINSLEY: I move the adoption of the recommendation. Seconded by Dr. Murphey.

PRESIDENT MARSHALL: It has been moved and seconded that the recommendation of the executive committee be adopted. Any remarks? If not, all those in favor of the motion signify it by saying "aye"; those opposed "no". Carried. It is so ordered.

DR. MAYO: I believe that is all.

PRESIDENT MARSHALL: Before we take up the subject of the election I would like to know if there is any unfinished business which should be taken up at this time.

DR. MURPHEY: What disposition was made of the history committee report?

PRESIDENT MARSHALL: The executive committee has not had a meeting since the last session, and I do not see how that can be handled at this session. Have you any suggestions to make as to what shall be done with it?

DR. MURPHEY: Can we not have a meeting to-morrow?

PRESIDENT MARSHALL: We could not report it back to the association because we have no meeting to-morrow. As I understand it, according to the by-laws the order of business requires that the election of officers be the last business transacted.

DR. HOSKINS: Can we not continue that committee by action of the association? I move you, that we continue the committee on history; we will still retain it as a special committee on the list. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: The motion is made and seconded that the committee on history be continued. Any remarks? Those in favor of the motion

make it manifest by saying "aye"; those opposed "no". The "ayes" have it. It is so ordered.

DR. MURPHEY: Would it be in order to move that a special committee be appointed to investigate the feasibility of the establishment of a veterinary museum at the Smithsonian Institute?

PRESIDENT MARSHALL: Could not that be done by your committee as well as by this association?

DR. MURPHEY: It might be if the chairman would care to take the responsibility.

PRESIDENT MARSHALL: I am ready for suggestions. We will put it up to you.

DR. MURPHEY: We will put it up to the chairman then.

PRESIDENT MARSHALL: Is there any other business which should be disposed of before the election of officers? If not, the next order of business, and the last, is the election of officers for the coming year. I do not know that all of the members before me are eligible to vote. If there is no objection I will ask every man who is entitled to vote to raise his hand so that we may see what members we have present. There are only a few, apparently, not entitled to vote. Could not they sit over on the side seats so that we may know the voters?

DR. DEURY: I put in my application for membership this year, and I don't know whether I have been elected to membership or not.

DR. MAYO: Yes, you were elected.

PRESIDENT MARSHALL: I would like to know if you are all satisfied. Shall we allow nomination speeches, and if so, how long shall they be?

DR. MOHLER: I move that the nomination speeches be limited to two minutes. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: You have heard the motion, that the nomination speeches, if any, be limited to two minutes. Those in favor of the motion manifest it by saying "aye". Those opposed "no". The "ayes" have it. It is so ordered.

The first man to be nominated is the president. Whom will you have for president?

DR. LONGLEY: For fifty-two years in the history of this association no one has been elected to the presidency from the territory west of the Mississippi River. This territory comprises a considerable number of square miles and contains a large percentage of the members of this association. The Pacific coast has selected a man they would like to place before this association, and he comes from this part of the State of California,—a Native Son. I take pleasure in presenting the name of Dr. R. A. Archibald.

DR. V. A. MOORE: I second that nomination.

DR. ROBINSON: I take pleasure in presenting the name of George Roberts of Indianapolis.

DR. HUGHES: I would like to second the nomination of Dr. Archibald also. I have known Dr. Archibald for a great number of years and he is well known

to this association. Dr. Archibald is a practitioner; he is a scientist; he is one of the best all-round representatives of this profession; and a gentleman. You will not make any mistake if you elect him to this high position—the highest this association could possibly give any man. I think Dr. Archibald will hold the position with credit to the association.

DR. ROBINSON: I renew the nomination of Dr. George Roberts of Indianapolis.

DR. ———: I wish to second the nomination.

DR. HUGHES: I move that the nominations be closed.

DR. V. A. MOORE: I second the motion.

PRESIDENT MARSHALL: We have two nominations; one for Dr. Archibald and the other for Dr. Roberts, and the motion is now made to close the nominations, which motion has been seconded. Are there any remarks? All those in favor of the motion make it manifest by saying "aye"; those opposed "no". The "ayes" have it. It is so ordered.

DR. FROTHINGHAM: I move that we proceed to vote by ballot.

PRESIDENT MARSHALL: You have heard the motion. All in favor signify it by saying "aye"; those opposed "no". It is so ordered and we will proceed to ballot for president.

DR. MOHLER: I move that the members voting pass around this way and drop their ballots in the hat. Seconded by Dr. Longley.

PRESIDENT MARSHALL: There is a motion before the house. It has been moved and seconded that the members pass by this point and drop their ballots into the hat. Any remarks? Those in favor of that manner of voting, make it manifest by saying "aye"; opposed "no". The "ayes" have it. It is so ordered. While the ballots are being counted we will proceed with the nominations for vice-president.

DR. SHEPARD: I would like to place in nomination for vice-president the name of a man you all know. He is a man for whom I cannot say too much. I refer to Dr. Robert W. Ellis. I would like to see you vote for him for vice-president. Seconded by Dr. V. A. Moore.

DR. DANIELS: There is a man who has done a lot of work for the association and I would like to place his name on the list of nominations for vice-president. I refer to Dr. R. P. Lyman. Seconded by Dr. Hughes.

DR. DALRYMPLE: So far as my recollection goes there is one state, an important section of this country, which has never had recognition on the list of vice-presidents. I refer to Wisconsin. It gives me great pleasure to place in nomination Dr. R. S. Heer of Belleville, Wisconsin.

DR. ———: I second the nomination of Dr. Heer.

DR. HUGHES: I take great pleasure in proposing the name of Dr. V. A. Moore for vice-president. Seconded by Dr. Kinsley.

DR. MOHLER: I wish to place in nomination the name of George W. Dunphy, one of the old guard.

DR. ———: I second the nomination.

DR. KEANE: I wish to nominate Dr. C. D. McGilvray.

DR. HOSKINS: I desire to second Dr. McGilvray's nomination.

DR. MURPHEY: How many vice-presidents do we elect?

PRESIDENT MARSHALL: Five.

DR. MCKENNA: I would like to place in nomination the name of Dr. Adolph Eichhorn for vice-president.

DR. EICHHORN: Thank you very much, but I had the honor to serve the year before.

DR. SCHNEIDER: I nominate Dr. W. H. Robinson of Maine. Seconded by Dr. Hart.

DR. TORRANCE: I would like to place in nomination Dr. Dalrymple of Louisiana.

DR. DALRYMPLE: If Dr. Torrance has no objection I would like to withdraw my name.

DR. EICHHORN: I would like to place in nomination Dr. George Hart of Los Angeles. Seconded by Dr. Fox.

DR. KINSLEY: I move that the nominations be closed. Seconded by Dr. Hughes.

PRESIDENT MARSHALL: It has been moved and seconded that the nominations be closed. Any remarks? All those in favor of the motion signify it by saying "aye"; those opposed "no". The motion is carried. I would like to appoint as tellers on this vote Dr. Lockett, Dr. Schroeder and Dr. Shepard.

DR. MAYO: It has been customary in the past for each member to vote for five men, and the five having the highest number of votes have been considered elected. The one receiving the highest number of votes will be first vice-president; the one receiving the second highest will be second vice-president; and so on.

PRESIDENT MARSHALL: Are you ready to proceed with the vote. The tellers appointed to count the vote for president are ready to report.

Total number of votes cast.....	109
Dr. Archibald received	86
Dr. Roberts received	23

DR. LYMAN: I would like to move that the election of Dr. Archibald be made unanimous.

PRESIDENT MARSHALL: All in favor of making Dr. Archibald's election unanimous signify it by saying "aye"; opposed "no". It is unanimous.

The next officer to be elected is the secretary. Whom will you nominate for secretary?

DR. STANGE: I have in mind a man who has made great personal sacrifices a great many times to attend veterinary meetings and otherwise done much for the welfare of the association. I think it is very essential that the secretary and president should be in close touch with each other. I therefore take great pleasure in nominating Dr. C. M. Haring. Seconded by Dr. Longley.

DR. KINSLEY: I grant you it certainly is advisable to have the president and secretary in close touch, but in view of the services rendered by our present

secretary, and in view of the fact that he is centrally located, I take pleasure in nominating Dr. N. S. Mayo. Seconded by Dr. S. Stewart.

DR. KNOWLES: I have the name of a western man who is also eminently qualified and who has had much experience in secretaryships as secretary of the Washington Livestock Sanitary Association and of the Northwestern Livestock Sanitary Association, Dr. S. B. Nelson, one of the strongest and soundest livestock growers of this country.

DR. ———: I second the nomination.

DR. FOX: I wish the opportunity of seconding the nomination of Dr. C. M. Haring.

DR. MURPHEY: I move that the nominations be closed. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: It has been moved and seconded that the nominations be closed. All in favor of the motion signify it by saying "aye"; opposed "no". It is carried.

I will appoint Drs. Moore, Knowles and Stange to act as tellers. Are you ready to cast the vote on secretary? If so, the tellers will take their positions and you can pass around again. Have you all voted now? If so, the vote for secretary is closed. The next in order is nomination for treasurer.

DR. BLATTENBURG: I have the extreme pleasure of nominating a gentleman from Pennsylvania whom you all know, and who is a mighty good man for the job, Dr. F. H. Schneider.

DR. FROTHINGHAM: I second the nomination.

DR. MURPHEY: I move that the rules be suspended and that the nominations be closed, and that the secretary be instructed to cast the unanimous ballot of this association for Dr. Schneider. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: Those in favor of the motion make it manifest by saying "aye"; opposed "no". The motion is carried.

DR. MAYO: In accordance with the vote of the association I cast the unanimous ballot of the association for Dr. Schneider.

PRESIDENT MARSHALL: And I as president declare him elected. Whom will you have for librarian?

DR. MAYO: I nominate Dr. J. N. Frost of Ithaca, N. Y. as librarian.

DR. KINSLEY: I move that the rules be suspended and the nominations closed, and that the secretary be instructed to cast the unanimous vote of the association for Dr. J. N. Frost as librarian.

DR. MURPHEY: It seems to me in view of the action of the association in taking up the matter of the publication of a journal that the editor of this journal should act as librarian for this association. It seems to me that would avoid unnecessary duplication. I do not know by just what method we would do that, and whether it would be possible to do it under the present constitution or not, but if proper, I should like to move that the editor of the Journal should act as librarian of the association.

PRESIDENT MARSHALL: There is a motion before the house. Your motion has not been seconded, has it, Dr. Kinsley?

DR. HUGHES: I think I seconded the motion. I will now anyhow.

PRESIDENT MARSHALL: You have heard the motion. It has been moved and seconded that the rules be suspended, the nominations be closed, and that the secretary be instructed to case the unanimous vote of the association for Dr. J. N. Frost of Ithaca, N. Y. as librarian. All those in favor of the motion signify it by saying "aye"; opposed "no". It is carried. It is so ordered.

DR. MAYO: In accordance with the instructions of the association I cast the ballot of the association in favor of Dr. J. N. Frost of Ithaca for librarian for the coming year.

PRESIDENT MARSHALL: That finishes the election. The tellers appointed to count the vote for secretary are now ready to report the results of that vote. I am not certain whether a plurality or a majority vote is required. Can anybody tell me? The vote is as follows:

Total votes cast	103
Dr. Haring received	47
Dr. Mayo	44
Dr. Nelson	12

Therefore Dr. Haring is declared elected.

DR. R. C. MOORE: It takes a majority, Mr. President. Dr. Haring has a plurality, not a majority.

PRESIDENT MARSHALL: We will have to vote again on secretary and the same tellers will please act.

DR. MOHLER: Whom are we voting for?

PRESIDENT MARSHALL: For the two receiving the highest vote.

DR. R. C. MOORE: I think the rule has been, as far back as I can remember, that the low man drops out.

PRESIDENT MARSHALL: We will proceed to vote for secretary. The tellers will please take their places. Have you all voted? If so, the vote for secretary is declared closed a second time. The tellers will proceed to count the vote.

I understand the tellers are now ready to report the vote for vice-presidents. The men receiving the five highest votes are: Moore 86, Ellis 77, Eichhorn 70, McGilvray 67, Hart 62. There were 109 votes cast. I presume it is not necessary to read the balance of the vote. I therefore declare Doctors Moore, Ellis, Eichhorn, McGilvray and Hart elected as the five vice-presidents.

The tellers are ready to report on the second vote for secretary. Haring receives 55 votes, Mayo 41, and Nelson 3. I therefore declare Dr. Haring elected as secretary of the association.

I think it is now in order to appoint a committee to escort the new officers to the platform.

DR. ARCHIBALD: Mr. President, do you propose to install the new officers this evening?

PRESIDENT MARSHALL: We should do that, I suppose.

DR. ARCHIBALD: I understand the executive committee has to meet tonight and if you install your officers, you will not have any executive committee.

PRESIDENT MARSHALL: That meeting as I understood it was not a meeting of the executive committee but a meeting of the committee on journal to consider its affairs and later report to the association.

DR. MCKENNA: The program for to-morrow provides for installation of officers on the Fair Grounds.

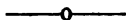
PRESIDENT MARSHALL: What is your pleasure gentlemen? Will you install your officers to-night?

DR. STANGE: It seems to me if the committee on arrangements has planned for the installation of officers we ought not to change the program.

PRESIDENT MARSHALL: Does anybody wish to speak on the subject? If not, is it your desire to have the program carried out as printed?

DR. JENSEN: I move we adjourn, Mr. President. Seconded by Dr. Hart.

PRESIDENT MARSHALL: It has been moved and seconded that we adjourn. All in favor signify it by saying "aye"; opposed "no". Gentlemen, we stand adjourned.



The following papers presented at the Oakland meeting have been published elsewhere as follows: Cardiac Insufficiency Due to Altitude, I. E. Newsom, American Journal of Veterinary Medicine, November, 1915. The Diagnosis of Open Cases of Tuberculosis, D. H. Udall, Report of the New York State Veterinary College, Ithaca, N. Y., 1913-1914. Rabies, Diagnosis and Treatment, C. A. Zell, American Journal of Veterinary Medicine, November, 1915.



REPORTS OF THE RESIDENT SECRETARIES OF THE A. V. M. A.

ARKANSAS

J. F. STANFORD, Fayetteville.

Being Resident Secretary of Arkansas I am directed to report to you on the condition of live-stock in Arkansas during the past year.

The state of Arkansas is in many ways making rapid progress along the improvement of live-stock. Many pure bred herds of cattle are being distributed over those counties that have recently been placed above the National quarantine line established to prevent the spread of Texas Fever in cattle. Many new counties have asked to be permitted to vote taxes to aid the Bureau of Animal Industry in the eradication of the cattle tick, which transmits the cause of Tick Fever and the tick is being eradicated in these counties

as rapidly as money can be raised for this purpose. The sentiment for tick eradication and the growing knowledge of the necessity for tick eradication is all due to a prolonged educational effort made in years that have passed both by the State's official through personal letters to the cattlemen and by personal visits and demonstrations by the Bureau Veterinarian in charge of such work.

The losses from hog cholera could be checked in a great measure but the state has been unable to do much officially because of lack of funds in making, distributing and using anti-hog-cholera serum in sufficient amounts. The last legislature, however, did something for this cause and it is hoped that we will be able to render a better report on hog cholera in our next annual report.

Tuberculosis exists to a limited extent among the dairy cattle in dairies located in or about our larger cities. The city veterinary officials are eliminating the small per cent of infection that is present.

The cases of influenza or infectious pleuropneumonia among horses and mules has not been as great this last winter as in past years. The types assumed in the few cases observed by the writer were pleuropneumonia paralysis of the larynx, pharynx or esophagus with very few cases of abdominal complications or what might be called catarrhal fever.

Black-leg in cattle in various parts of the state has been reported but the losses were small due to rapid and efficient work on the part of practicing veterinarians.

Anthrax has made its appearance in two or three counties of the state, but was fairly well controlled by the State's official veterinarian and his deputies. The outbreak was largely due to the neglect of the stockmen to keep their stock vaccinated annually as they were advised years ago to do, after having suffered greatly from the appearance of this disease.

Glanders in horses and mules in the state is not so common as in the four or five years past, this is due to the requirement for inspection of all horse stock shipped into the state. This association could improve the interstate inspection regulations of live-stock by going on record as disapproving the appointment by state veterinarians of undergraduates as deputy inspectors which is done by some state veterinarians solely for political prestige. The licensed undergraduate is not properly qualified for this class of veterinary work.

Through the efforts of a few of the faithful veterinarians of

the state and after a prolonged fight extending over years of time. Arkansas has a veterinary practice law. While the law is not what it should be, still we are proud of the start we have made and are sure that our veterinary board by careful watching will be able to weed out many of the undesirable quacks that our law allowed to register without examination.

The Veterinary Medical Association of Arkansas is in a flourishing condition. The regular annual and call meetings are well attended and it is the desire to soon have a state veterinary association composed only of graduate veterinarians.

ARIZONA

J. C. NORTON, Phoenix.

Though for many years I have been resident secretary of Arizona and part of the time of New Mexico as well, I have not made a report every year because there was nothing special to report. I will state, however, that conditions in Arizona this year as regards veterinarians is about the same as it has been for ten years past, though our population has increased each year, there are only comparatively few cities located in irrigated valleys where there is sufficient practice to warrant a graduate veterinarian's time.

Several new graduate veterinarians came into the state recently and quite a number of quacks, the latter largely because more stringent practice laws are being enforced in other states. I think there is no state in the union where the automobile has affected veterinary work on horses as much as in Arizona. Our country is one of long distances, that is, different settlements may be separated many miles by deserts, and as our roads are fairly good and we have but little rain and no snow in most of the state, the automobile can be used every month in the year.

Live stock sanitary work in the state is still well cared for under state laws similar to those enforced when Arizona was a Territory. Your humble servant held the position of Territorial Veterinarian for 19 years and resigned when Arizona became a state, and was succeeded by Dr. W. E. Severn who now holds the position of state veterinarian. This state is practically free from all of the more important contagious diseases of live stock.

There is no State Veterinary Medical Society in Arizona but a few veterinarians drafted a law the past year with a view to

governing the practice of veterinary medicine but it failed to pass.

Though I am not in active practice at the present time, I am in touch with the live stock conditions in the state and visit most portions of the state each year, and if I can be of assistance in answering any questions or advise any fellow veterinarian of conditions in Arizona, the youngest state in the union, I will be glad to do so.

COLORADO

CHARLES G. LAMB, Denver.

Nothing of special moment has occurred in veterinary matters since the last report. No additions or amendments to the present veterinary practice act were attempted during the session of the last legislature. The present law, if it were enforced, is fairly satisfactory.

A bill was introduced requiring that the State Meat and Slaughter Plant Inspector should be a veterinarian, but it failed to pass. A bill was passed, however, giving the State Veterinary Surgeon authority to appoint graduate veterinarians in various portions of the state as deputy state veterinarians to receive compensation only when employed. This will enable the state veterinarian to have all cases of reported diseases investigated without loss of time, which will be of great advantage many times.

The state is comparatively free from live stock diseases at the present time. Mange in cattle, which has been a bugbear for several years, is practically eradicated and scab in sheep is rapidly being exterminated. These results are largely due to the efforts of the Bureau of Animal Industry working in conjunction with the state authorities. Only a few cases of glanders have been discovered and these in isolated cases and nothing resembling an epidemic.

Blackleg has been quite prevalent and of a particularly virulent type, deaths continuing in spite of vaccination. A few deaths from anthrax have been reported but from a portion of the state which has for some time been infected and where deaths occur nearly every year. Hog cholera is more or less prevalent in all portions of the state though less this year than last. As in other states there is a great difference of opinion among hog owners as to the advisability of vaccination and of the comparative merits of single and double treatments,

FLORIDA

F. W. PORTER, Tampa.

As a state, Florida has little to report in veterinary progress: or if it has, your resident secretary has failed to find it.

Florida has no law that any white man need respect and as a profession, the veterinarian has no legal recognition at all. The drug clerk who fills his prescription must show that he is qualified to do so; but the darkey on the street or the stable roust-about is presumed to be fully qualified to write said prescription.

During my residence in Tampa, Florida, dating from 1914, I have made an attempt at each session of the state legislature to get a veterinary practice act passed. Up to the session of 1913 I was unable to get any help whatever from the few professional veterinarians in the state. During that winter Dr. Charles F. Dawson of our State Board of Health, a few others and myself, formed a nucleus of what we hope will develop into an active state association.

In the winter of 1912 a meeting, attended by nearly all of the most prominent stock growers of Florida, was held at the State University, at Gainesville, Florida in the interest of tick eradication. Representatives of the Bureau of Animal Industry were present and government aid offered but no advantage of the offer was taken by the state legislature at its meeting in the spring of 1913 and of course no government aid was given. Since then some thirty or forty vats have been built in different parts of the state and the work is progressing slowly. Two of these vats are near Tampa and while at first used only by the owners and visited by the neighbors from curiosity; these neighbors are now watching for a dipping, to send their own cattle through.

It is a noticeable peculiarity in this region: that, while we have about all the infectious diseases that our class of patients are subject to, such infections are almost always in mild form. I am informed that the same rule holds true in human practice also. For years glanders was always present in Tampa, yet never epidemic. About three years ago we abolished the open, street drinking fountain and, with it, glanders. We now have a few specially designed fountains about the city which have proved very successful. I have a model with me, for the inspection of any who may be interested.

Rabies, also is always with us but very seldom seen except in

the form of "Dumb Rabies". In 1912 this disease did become highly prevalent and resulted in the destruction of a large number of worthless curs and the practical elimination of this very dangerous disease.

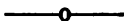
"Black Tongue" (Hepatic Stomatitis of Mueller) has taken a heavy toll among our more valuable dogs but recently we have found that a large per cent of the cases will make a rapid recovery when given the thymol treatment for hook worm. In this connection I wish to report that the only cases of chorea I have ever been successful with, have yielded to the same treatment.

The most troublesome local condition that we have to contend with in Florida is a ray fungus infection locally known as "Leeches". Its habitat is ponds and marshes and it is usually a rainy season difficulty. One is apt to meet it at any season and once introduced into a stable, it remains there. It is readily carried by flies from a seat of infection to any open wound. The small, black, biting fly, common around stables and dairy barns can and does inoculate it. Cattle suffer very little from these sores, for if the infection does occur where the animal can get it with the tongue, that rough tongue will do its own surgery. The growth is very resistant to treatment but can be destroyed by caustic potash, in any form, or applied with arsenic. This latter method gives a very slow healing. A fresh infection, that has not gotten deep into the tissue will sometimes yield to chrysophanic acid. Zinc, either the oxide or the chloride or in combination, are also sometimes successful. Silver nitrate is a first class fertilizer for this condition. Where surgery can be applied, either with the knife or by actual cautery, it is by far the best method. When the hoof is attacked, treatment is almost useless; although I have had one case where I destroyed the entire outer quarter of the hoof, cutting out the plantar cushion and the coronet half way to the toe and then got complete healing. But it took three years to get it. The animal is now in good service and the present owners have recently refused an offer of \$250. for him.

This report was originally prepared to be presented at the proposed meeting at New Orleans in December, 1914. Since that time, on February 15th, 1915, the FLORIDA VETERINARY MEDICAL ASSOCIATION was duly organized in the city of Tampa with Dr. Chas. F. Dawson, veterinarian for the State Board of Health as president, Dr. F. A. Armstrong as vice-president, and Dr. Fred W. Porter as

secretary. The first act of the new association was to prepare and present a bill for the control of the practice of veterinary medicine in this state.

The House of Representatives of the Florida Legislature has again set us aside; (June 15th, 1915) this time because the engrossing clerk left out the enacting clause. We shall try again two years hence. In the meantime, Florida will continue to be a very pleasant dumping ground for our neighboring states, all of which have practice laws on their statute books.



IDAHO

E. T. BAKER, Moscow.

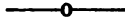
About one-fourth of the graduate veterinarians in Idaho are members of the American Veterinary Medical Association.

The status of the veterinarian is being gradually raised in this state by the veterinary practice act passed by our legislature three years ago. While some rather undesirable men secured licenses, it will have a tendency to discourage emigration from neighboring states, as Idaho has long been the dumping ground of the northwest in this respect.

At the present time politics have too large a part to play in our state legislation, but this applies to more states than ours.

The condition of our live stock is better than for several years. Among horses, sporadic cases of glanders, pernicious anemia and mange have been reported. Cattle are remarkably free from tuberculosis, due to a majority of them being of the range type. Dairy regions, however, have their quota of it, and also contagious abortion. We have been free from foot-and-mouth disease—the nearest cases being at Spokane, just over the line in Washington. A few epidemics of blackleg occurred, but were quickly controlled. In hogs, cholera continues to cause the most excitement, especially in the southern part of the state. Due to federal and state efforts, combined with rigid quarantines prohibiting the shipment of hogs in from the middle west on account of foot-and-mouth disease, it is being rapidly eradicated, although it is probable that we shall always have it. Sheep are very free from disease, practically no scab being reported. This is a fortunate condition, for with the high price of mutton and wool, the sheepmen have made up for the lean years of the past,

Our non-contagious diseases keep our veterinarians fairly busy, being mostly digestive disorders and barb wire cuts in horses; udder and calving troubles in cows; forage poisoning in sheep; and worms in hogs. We have a wide variety of ailments, and are often called on to diagnose some diseases among turkeys and chickens, Idaho being a large poultry producer.



MASSACHUSETTS

FRANCIS ABELE, JR., Quincy.

As resident secretary for Massachusetts I offer the following report:

Since our last meeting the office of Chief of the Department of Animal Industry has been transferred from a layman to a veterinarian. We credit the layman with securing double the former salary, which makes the office more of an attraction. Dr. Howard, the new chief, is a long-time member of this association, and came into office January 2, 1915. His predecessor had a complete outfit of assistants, not all of whom were veterinarians. Dr. Howard has appointed no new ones. At present our big cattle market at Brighton is closed. We expect that in the future a tag saying, "tested at Brighton, Mass." will mean what it says.

In 1914, 1948 cattle were killed for tuberculosis in Massachusetts, of which 654 were from outside the state. There were 857 cases of glanders in 1914 of which 352 were from Boston, a decrease for that city of 39% from the previous year. This was evidently due to the closing of the water troughs. In the rest of the state the decrease was only 6% with troughs not closed.

Rabies has been on the increase of late and in Boston dogs are on leash. In 1904, 250 dogs, 3 cattle, 8 pigs, 1 horse and 1 cat died with this disease.

As foot-and-mouth disease will be discussed by others, I will only say that up to June 22, 1915, 2114 cattle, 6116 swine, 77 sheep and 11 goats were killed on 98 premises for this disease. The long delays before killing, allowing a saturation of the premises, during the early part of the trouble, has been remedied, so that twenty-four hours from the time of reporting the infection of the premises, it is eradicated. It is probable that no upstate cattle will be at our fairs this fall. Even local cattle may not be there. It is possible that the cattle market may open in September. At

present cattle are shipped in, to private parties on permit and quarantined for 15 days until released by the state.

A milk bill, looking to the inspection of out of state dairies, similar to our state inspection, failed to pass.

Rebellious farmers caused the overthrow of the old State Board of Health which persecuted them. They see the same old faces and the same unreasonable treatment. Until a practical veterinarian is appointed on that board, who can see facts as farmers see them, there must be conflicts.

The Massachusetts veterinarians feel highly elated at the success of their association during the last year. In 1914 they admitted five new members, in the first five months of 1915 they admitted fourteen new members. At their annual banquet, Dr. Klein of Philadelphia, was the invited guest, and for the first time in its history, the Governor of the state graced the meeting. This was held in the new Boston City Club house, the largest in existence. The Governor expressed his appreciation to the veterinarians' services to the state, in a whole souled manner.

MINNESOTA

G. ED. LEECH, Winona.

The state of Minnesota has reason to be proud of the fact that she has passed through the scourge of foot-and-mouth disease which has swept over the country, and surrounded her on all sides, except Canada, and remained a free state, during it all. This may be due to one thing or another, perhaps more particularly to the vigilance of the Live Stock Sanitary Board and their corps of inspectors. However, there has not been a single case within its borders.

Our greatest trouble has been with hog cholera, which is still to-day a menace in spite of all the advanced thought in hog cholera research work. Out of over eight hundred cases reported, from different sources, but forty-three were found to be glandered and destroyed, showing a large falling off in this particular disease.

Dourine gave us some trouble last year, on the western border, but this year none has been reported.

Influenza and strangles have been the principal ailments over the state this year, and have taken on complications in the forms of bronchitis, laryngitis, and pharyngitis, with a great many losses reported.

Our state veterinary society is in a most flourishing condition, and taken all together, the Minnesota profession is generally in a prosperous and thrifty condition, and invites you all to our annual meeting in January, 1916.

OKLAHOMA

CHAS. H. JEWELL, Fort Sill.

The question of a report on veterinary matters in this state I shall have to confine to such information as I am able to obtain from others and for such I am indebted to Dr. E. V. Robnett, State Veterinarian for Oklahoma, who kindly furnished me with a brief report from his office.

The state veterinarian was fortunate in obtaining ten thousand dollars to make a fight against foot-and-mouth disease and reports that not a single case has been found in the state. There were several reports of a suspicious nature but these proved to be either mycotic stomatitis or cases of animals suffering from necrobacillosis. On account of the outbreak of foot-and-mouth disease in four counties of Kansas, a very rigid quarantine was established by the state against interstate shipments and proved effective.

During the year sixty-seven (67) head of horses and mules have been killed for glanders and the state veterinarian has several others which have reacted and are being held in quarantine for future action.

The state now requires that all horses and mules entering the state be subjected to the mallein test. The Oklahoma State Board of Agriculture recently passed a resolution requiring that all dairy cows furnishing milk for public or private consumption shall be given either the intradermal or the thermic tuberculin test, depending in each case which might be the most practical to administer. Since this order went into effect thirty-two (32) reacting cows have been killed under federal post-mortem inspection and every one of them was condemned to go to the fertilizer tank. All testing is done by veterinarians who are recognized by the State Board of Agriculture and the reports so far show a very small per cent of reactors, estimated at one-half of one per cent, and those reacting are usually found to be animals shipped in from northern states. The native stock which has never been subjected to housing are found to be practically free from tuberculosis.

During the past year there has been one outbreak of coital exanthema and this originated from an infected stallion and he transmitted the same to thirty-one (31) mares which had been bred to him.

Hog cholera has caused extensive losses within the state and has been prevalent in every county. Considerable vaccination has been carried on and the results have been highly gratifying, especially when carried out before the disease had made too much headway.

The simultaneous method is the one which seems to have given the best results and is most generally the method employed by the veterinarians within the state.

On account of the extensive trade in horses and mules, due to the demand abroad for war animals, there has been a constant gathering together of large numbers of animals and this has resulted in numerous outbreaks of shipping fevers such as influenza, strangles and catarrhal fever with their numerous complications, such as pleurisy, pneumonia and hemorrhagic septicemia; which entailed heavy losses for the dealers. There have been numerous reports of blackleg and a considerable number of Texas fever.

The state law relating to inter-state shipping seems to be working smoothly and good results have been obtained with very little friction.

There are two state veterinary societies, one composed of graduate veterinarians and the other of non-graduates, the latter outnumbering the other many-fold.

Practice, from what I can learn, has been very good during the past year and there is a great demand within the state for live energetic qualified practitioners.

NEVADA.

WINFRED B. MACK, Reno.

As there was no meeting of the association in 1914 no report was made for that year. Therefore this report covers the years 1914-15.

The legislature of 1915 created a State Veterinary Control Service and a State Board of Live Stock Commissioners. The first provides for the diagnosis of infectious diseases of animals and the preparation and distribution of sera and vaccines for their con-

trol. The work is done in the veterinary bacteriological laboratories of the University of Nevada. The writer was appointed director of that service and becomes by virtue of such appointment, *ex-officio* State Quarantine Officer, a position created by the act. The appointment is made by the President and Regents of the University, this arrangement removing the quarantine power from political influence. The duties are similar to those of a state veterinarian. The Live Stock Commission cooperates with the Director of the State Veterinary Control Service in the control and eradication of outbreaks of infectious disease. They may levy special taxes on live stock to combat infectious diseases and have authority over all live stock matters except sheep, the latter being handled by a State Sheep Commission, created in 1907. The financial arrangement is flexible; under normal conditions nominal sums will be raised, suitable to meet those conditions, but in case of emergency larger amounts will be available. Provision is made for cooperation with the Bureau of Animal Industry when their assistance is needed.

With high prices for live stock and a gradual improvement in the care of animals together with the development of the dairying and hog-raising industries the conditions for practice continue to improve. Several men have established successful practices here and there is room for a few more well qualified men.

The health of Nevada live stock is proverbial. The reputation of our meat animals in this respect is not exceeded by those from any state. In the abattoirs which draw their supply of cattle and sheep from Nevada, condemnations by the meat inspectors at time of slaughter are almost unknown. While the list of diseases with which this report deals may appear formidable, this is due rather to a close watch for their occurrence in an adequate control system rather than to an undue prevalence of those maladies.

Much of the veterinary activity of the state centers about the University of Nevada. Their veterinary department was established January 1st, 1907. For eight years it was a one-man affair devoting its energies and resources to research and instruction, gradually undertaking to assist in control work as the demand increased. In 1913 the responsibility for quarantine and control was vested in a State Quarantine Board, of which the writer was chairman. He assumed the full responsibility for that work in 1915 as above noted. In January, 1915, two veterinarians were added to the department, a laboratory man and a field man, the

latter in cooperation with the Agricultural Extension Division of the University. A second laboratory man has been secured recently, making a staff of four veterinarians. The department thus undertakes teaching, research, quarantine, control and eradication of infectious diseases for the state, employing, in addition to its staff, the various practitioners upon a *per diem* basis as needed. This organization is rendering efficient service to the live stock industry of the state, reducing the losses from infectious diseases to a minimum. A system of district veterinarians under the control of the State Quarantine Officer is contemplated which will enable us to quickly locate every outbreak of infection and eradicate it. This rapid growth of veterinary activity in the state does not indicate an increase in prevalence of disease but an appreciation of veterinary service by the live stock men and a refinement of methods of raising and handling domesticated animals. Our live stock companies are coming to realize that communicable diseases are, to a great extent, preventable and that most of the losses due to them can be avoided.

The plan of centering the state's veterinary activities at the State University has much to commend it. It avoids duplication of men and equipment; secures a proper alignment and coordination of effort; attracts to it talent of a high order, thus making for greater efficiency; frees it from political influences; and all at a greater economy of expenditure than other plans. It should be applied more widely in the stock-growing states.

Sheep scabies has been completely eradicated and the Federal Quarantine raised from the remainder of the state. The State Sheep Commission has had to deal with a somewhat serious outbreak of genital necrobacillosis in rams and are advising dipping sheep to rid them of ticks, which many sheepmen consider sufficiently detrimental to warrant the labor and expense of dipping.

Equine anemia, which in 1906-09 was prevalent in certain districts, destroying a large number of horses, has been of little economic importance of late. Only a few scattering cases have come to our notice, too few in fact for a proper continuance of our study of that disease.

Strangles and equine influenza have levied their usual tax upon the horse breeders, their prevalence being about what the breeders consider normal.

Hog cholera has appeared in several sections of the state but

each outbreak has been quickly suppressed by the prompt use of serum. Partially as a result of the effective use of serum in the prompt control of outbreaks of hog cholera, the swine raising industry has assumed considerable proportions, farmers being no longer apprehensive regarding the safety of their investments in hogs, as the menace of cholera has been largely removed.

Bovine tuberculosis is less prevalent in our dairy herds than we have supposed. Considerable tuberculin testing has been done in the dairying districts, revealing but an occasional reacting herd and those but slightly affected. That fortunate condition renders the eradication of tuberculosis possible in the not remote future. As the state allows dairy cattle to enter only subject to the tuberculin test, by retesting after a suitable interval, by testing existing herds, and exercising a proper control over all reacting animals, as is being undertaken, we can soon rid the dairy herds of the disease and keep them free from it. Tuberculosis is exceedingly rare in Nevada range cattle.

Anthrax is prevalent in a few districts. The loss from it is slight as vaccination is coming to be generally practiced in the herds grazing upon infected lands.

Blackleg is widely prevalent but in the infected districts vaccination is universally employed with the result that the loss from it is insignificant.

Chicken cholera has appeared in a few flocks in widely separated localities. Attempts to suppress these outbreaks by the use of killed cultures of *Bacterium avisepticus* have proven successful. The Agricultural Experiment Station will issue a bulletin in the near future giving the results of this work.

Contagious epithelioma in chickens was unusually prevalent and destructive in Reno flocks during the winter of 1914-15. The Agricultural Experiment Station undertook to control it by vaccination as a research project. The results of the experiments were gratifying. They have been published as Nevada Agricultural Experiment Station Bulletin No. 82. A popular account of that work, well illustrated, will soon appear as bulletin No. 83.

Two rare diseases in young lambs have been encountered. The first, umbilical necrobacillosis, was observed in one flock, where the loss due to it was estimated at 1540 lambs out of 5200 born in the flock. An account of those observations appeared in the August, 1915, number of the *American Veterinary Review*. The second,

fatty degeneration of muscles in suckling lambs, was observed in a small band of pure-bred Hampshire sheep. The ewes were closely confined during the winter upon an exclusive alfalfa diet. Several lambs, from three to fifteen days old, developed an extreme muscular weakness, first appearing as a peculiar wobbling gait, soon developing into inability to stand or walk. The progress of the disease was rapid, the affected individuals succumbing in a few days after the first symptoms were noticeable. Clinical observation indicated muscular rather than paralytic trouble. About twenty lambs died from the trouble. Autopsies revealed extensive fatty degeneration of the skeletal muscles, generally distributed throughout the body. This condition is discussed briefly by Hutyra and Marek. They state that the cause is unknown but suggest hereditary predisposition, too close breeding, and excessive fat content of milk. A brief description of this occurrence will appear in the Annual Report of the Nevada Agricultural Experiment Station for the year ending June 30, 1915.

The appearance of rabies in the state is the most serious occurrence of the year. The far west was free from rabies until 1909, when it appeared in Los Angeles, California. It spread over California, into Oregon and thence into northern Nevada. The first definite knowledge of its appearance here was gained from the examination of a coyote's head, sent from extreme northern Humboldt County for that purpose. It has appeared several times at California points near the state line during the past three years but never extended into our territory. Since its introduction here it has spread into five counties and is now disseminated over a wide area. In view of the fact that northern Nevada is a sparsely populated mountainous country, devoted to live stock raising under range conditions, and infested with coyotes, the problem of control is different than in a thickly populated district which is free from wild animals, and correspondingly difficult. A number of people have been attacked and bitten by rabid coyotes and dogs and live stock losses from rabies are becoming numerous. Fortunately no deaths have occurred in human beings. All exposed persons have received the Pasteur treatment at the University. So far the disease has not invaded the larger towns but it will do so ultimately. Then the muzzling and confinement of dogs will enter into the problem of control.

Coyote extermination is the logical method for holding rabies

in check under the above mentioned conditions, but the difficulty of that undertaking is appreciated only when the character and extent of the country, together with the nature and habits of this crafty animal are considered. However, an attempt is being made to exterminate or to at least greatly reduce the number of coyotes. By arrangement between the veterinary control authorities of the state and the United States Bureau of Biological Survey the latter have placed twenty-five men in the infected territory under the direction of an inspector to hunt, trap and poison coyotes. They are doing excellent work which we are hopeful will serve to at least reduce the losses due to the disease.

Nevada has, in common with her neighbors, maintained a rigid quarantine against the shipment of live stock from the East and middle West on account of foot and mouth disease and has escaped its introduction.

NEW MEXICO

FRANK H. BARR, Albuquerque.

In rendering a report briefly covering points of interest to veterinarians concerning the veterinary situation in New Mexico my report is intended to include the year 1914 as well as the present year, as it is understood that no report from New Mexico was submitted last year on account of the National Association not having met.

Laws directly affecting the practice of veterinary medicine and veterinary practitioners in this state have been introduced before the legislative bodies of New Mexico at the past two meetings and although no direct laws governing practice or protecting the qualified practitioner have been enacted, several acts, such as providing for veterinary inspection of hogs; the mallein testing of horses; the testing of cows for tuberculosis; and the stallion registration law, which provides for the certification of all stallions and jacks within the state doing public service to be certified and passed upon by qualified veterinarians; have a tendency to raise the standard of practice for the qualified man.

The control of animal diseases in New Mexico is in the hands of two boards which are respectively known as the New Mexico Sheep Sanitary Board, with jurisdiction over sheep and goats; and the New Mexico Cattle Sanitary Board, dealing with matters affect-

ing the health of horses, mules, cattle and hogs. Each board is empowered to formulate regulations as conditions may require. There is no state veterinarian.

The number of qualified veterinarians, (class A. school men) now engaged in private practice in New Mexico is about seven. The United States Bureau of Animal Industry employs approximately fifteen in its cooperative work within the state.

The New Mexico sanitary boards at this time recognize and have commissioned all private practitioners within the state who have previously satisfied the boards regarding their fitness and who have shown that they are graduates from class A. schools.

Veterinarians employed on state work are reimbursed on a *per diem* basis including expenses. Such *per diem* rate compares favorably with that provided for by other states doing similar work.

The field for the general practitioner is necessarily somewhat limited owing to the sparsely settled condition of the country, however qualified men at present with the aid of state work make the practice of their profession a fairly remunerative work and are gradually enlarging their scope of usefulness. The field of veterinary practice in this state is well covered by qualified practitioners; the non-graduate veterinarians, of whom there are several, do not find business at all lucrative.

Relative to animal diseases within the state it can be stated that our live-stock generally is very free from contagious and infectious diseases. Cattle in general, as in the case of range stock in other western range sections are particularly free from disease; especially tuberculosis. However, considerable tubercular infection is being found in dairy cattle recently shipped into the state. Horses are quite free from glanders; only three cases having been recorded within the past four years. An outbreak of dourine has occurred on the Navajo Indian Reservation in western New Mexico, the original infection having been introduced in a stallion originating in the state of Wyoming. Above situation is at present being handled by the Office of Indian Affairs cooperating with veterinarians of the Federal Bureau of Animal Industry. Contagious abortion of cattle is at a minimum and only occasionally is there being reported sporadic outbreaks of hog-cholera.

The quarantine regulations affecting the entrance of live-stock into the state have been considerably modified the past year in order to meet conditions relative to the prevention of the spread of foot

and mouth disease. Copies of any state regulation may be had by application to the secretary of the particular board governing the kind of live-stock in question. Both boards maintain offices at Albuquerque, New Mexico.

In conclusion I am pleased to report that legislation is contemplated looking toward a workable practice act and it is very probable that when passed will also provide for the office of state veterinarian. Inasmuch as it is generally conceded that state-wide measures affecting the health of live-stock should be in the hands of the qualified veterinarians, so here in New Mexico, even though there is no state association efforts will constantly be made to keep the profession in public demand, and so ever increase the usefulness of local practitioners as well as eventually having the problems of state sanitation devolve upon the qualified, professional men.

NEW YORK

C. D. PEARCE, Binghamton.

As far as diseases of domestic animals in the State of New York are concerned, conditions probably have not materially differed from past years. The most serious proposition, however, which has confronted us within the past twelve months was the outbreak of foot-and-mouth disease. At present everything looks extremely favorable for the complete eradication of this plague. The total number of animals destroyed in New York State was 5709 cattle, 498 swine, 150 sheep and 38 goats, involving a total expenditure of about \$27,000 for indemnities, expenses, etc. During the past few weeks we have had one or two isolated cases of foot-and-mouth trouble. These latter cases do not show in the above figures.

Bovine tuberculosis, has, as heretofore, occupied much attention. Legislation has been proposed looking toward more practical means of controlling or eradicating the disease. A commission was appointed by the Governor in 1913, which made a careful study of the situation and issued a rather complete report. Certain changes in the law were suggested, which will perhaps be enacted during the coming legislative session. The number of animals tuberculin tested has increased, while the percentage of reactors has decreased. The total number, however, that are examined each year by means of this test, is but a very small percentage of all cattle in the state. It seems to be the consensus of opinion by those who

have studied this question that skim milk is an important means for the distribution of this disease, and that complete pasteurization of such milk before feeding to hogs and calves is necessary as one of the means of checking bovine tuberculosis.

Glanders is still prevalent in our larger cities, but the percentage of clinical cases of this disease is less than heretofore. The ophthalmic test has been generally recognized as an official test in the state and is very satisfactory because of its ease of operation. There is a tendency toward decreasing indemnity allowance by the state for clinical cases of glanders.

Rabies exists in New York to a considerable extent. Owing to the local system of control over dogs and to the lack of interest on the part of town and municipal authorities, it has gotten somewhat beyond control and is apparently more prevalent than for some time. Legislation looking to a more drastic supervision over this disease is necessary to control the spread of rabies.

An outbreak of swamp fever occurred in the northern part of the state. Drs. Udall and Fitch, of the New York State Veterinary College, Cornell University, were called to investigate the cause of horses dying in this section and finally made the diagnosis of swamp fever, and by inoculation reproduced the disease in well animals. No one suspected swamp fever as this is the first known outbreak to have occurred in the East. The district is now under quarantine by the State Department, and it is hoped that the disease may be confined to that section of the state. Its introduction into New York is supposed to have been brought about by shipments of western horses.

Anthrax and blackleg are still quite prevalent, but because of prophylactic measures now generally employed are less serious than in the past.

Hog cholera seems to be increasing. The serum treatment is the only method generally advised by the state authorities, but the simultaneous treatment may be used under proper supervision. Recent investigations at our State Veterinary College at Cornell University indicate that this disease is being spread to some extent by pork scraps, ham rinds, etc., from affected hogs.

Other diseases have not been reported to any alarming extent, with the exception of contagious abortion, which is fairly general throughout the state and is productive of much loss. It is difficult to control and is one of the big problems of the dairy industry. Dr.

Williams, of the New York State Veterinary College, Cornell University, and others interested are working on this problem with a view to controlling this wide-spread disease.

In regard to changes in the veterinary laws, there are three changes which have occurred recently:

In the appointment of the State Board of Veterinary Medical Examiners, there is to be a board of five veterinary medical examiners holding office for five years as heretofore, but beginning with August 1, 1915, the board shall be appointed so that the term of one member shall expire each year, which has not been the case heretofore. Furthermore, the New York State Veterinary Medical Society shall at each annual meeting nominate five examiners. These names are annually transmitted to the State Board of Regents who shall appoint from this list the examiner whose term expires and fill any other vacancies which may occur.

Another change or addition to the old law occurs in the article under registry. It requires that every person who lawfully practices veterinary medicine in the state of New York shall report annually during the month of January, under oath, to the State Board of Examiners, any facts required by the board, shall pay to the Regents a registration fee of one dollar (\$1.00), and shall receive a certificate of registration that must be conspicuously displayed together with the original certificate of registration. Heretofore it has not been necessary to register annually.

The third change in the veterinary laws refers to the article on penalties and their collection. Heretofore any person practicing veterinary medicine within the state without lawful registration or in violation of any provision of this article forfeited \$50.00 to the county in which said violation occurred for each violation and for every day of such unlawful practice, and any incorporated veterinary medical society of the state or any county veterinary medical society of such county entitled to representation in a state society, might bring action in the name of such county for the collection of penalties, and the expenses incurred in such prosecution might be deducted from penalties collected and the balance turned over to the county treasurer.

Under the changed law, the portion of the article referring to the above reads: every person who shall practice veterinary medicine within the state without lawful registration or in violation of any provision of this article shall be guilty of a misdemeanor, and

shall forfeit to the people of the State of New York, the sum of fifty dollars for each offense, which may be paid to the board or sued for and recovered in the name of the people of the State of New York in an action brought therefore by the attorney general. This makes the attorney general the prosecuting attorney.

One other item which may be of interest is the fact that for the past year or two the veterinarians have been active in organizing local veterinary societies, taking their members from one to several counties and holding meetings at stated intervals. The districts covered by these local veterinary medical associations practically cover the whole state. Besides the New York State Veterinary Medical Society, we have in the state the following: The Southern Tier, the Western New York, the Central New York, the Genesee Valley, the Hudson Valley, the New York County, and the Rockland County Veterinary Medical Associations. The Genesee Valley and the New York County Societies have been organized for some time.

NORTH CAROLINA

G. A. ROBERTS, Raleigh.

Early history of the veterinary profession in North Carolina has chronicled the residence of Dr. D. E. Salmon at Asheville in 1875. In 1893 Dr. T. B. Carroll returned to his home town, Wilmington, N. C., having obtained his D.V.S. from the Veterinary Department of the Baltimore Medical College. In 1896 Dr. J. W. Petty received his degree from the National Veterinary College and after a short practice at his home town, Winston-Salem, moved to Greensboro and later to Durham.

In 1897 the North Carolina Veterinary Medical Association was formed, its members consisting of the above two veterinarians, two M.D.'s and four others. Dr. Ellis, M.D. of Charlotte was made its first president.

In 1898 Dr. Cooper Curtice was elected by the State Board of Agriculture as the first State Veterinarian and Animal Husbandman of North Carolina. After some two years of service as such he accepted a position with the Rhode Island Experiment Station.

In 1901 Dr. Tait Butler became State Veterinarian and Animal Husbandman to which was added Director of Farmers Institutes. It was in this capacity that he became popularly known as

"Tick" Butler for his demonstrating the feasibility of eradicating the fever tick. As Director of Institutes he became as widely and favorably known perhaps as any individual in the state.

After filling this capacity for seven and one-half years he resigned in December, 1908, to become associate editor of the *Progressive Farmer*.

In March, 1903, a veterinary practice act was passed by the legislature and while it contained no penalty clause till 1913 it served as a good "scarecrow" to many. It recognized the association as a body politic and gave us a State Examining board.

The first Board consisted of Dr. J. W. Petty for 1 year; Dr. T. B. Carroll, 2 years; W. C. McMackin, Raleigh, 3 years; B. L. Griffin, Concord, 4 years; and Dr. Tait Butler, 5 years.

It was six months following the passage of this law before the writer appeared in North Carolina upon the scene of action.

We now have fifty graduates in the state, all but four or five of which are members of our state association and nine are members of the A.V.M.A., with others seeking admission.

Four B.A.I. men are employed at present on tick eradication. Twenty-eight counties of the one hundred in the state are still tick infested.

One B.A.I. man is engaged in hog cholera serum demonstration work.

Six non-graduates have been licensed to practice in the state by the board for diplomatic reasons.

Some twenty-five men have registered under the "grand father" clause of our law.

We have quite a variety of diseases in North Carolina, yet we are free from some serious maladies and suffer little from others.

Anthrax: No authentic reports, though one or two suspicious cases.

Black Leg: Considerable in the mountainous region of the state, several recent reports. Occasionally seen in the central part.

Black Tongue in Dogs: (Southern Dog Plague) continues to baffle the investigator and the practitioner in spite of the fact that frequent reports announce positive causes and other "sure cures".

Bursatte: Horses and mules are occasionally afflicted with stubborn "summer sores" that are only certainly relieved by cool weather.

Forage Poisoning: One of our most serious losses comes from

this source. A great deal of investigation has been made concerning its etiology and therapeutics but little more information has been obtained than formerly possessed. The mortality is very high, yet a greater number of recoveries are being obtained by early purges and stimulants than formerly.

Glanders: Despite the fact that a very large per cent of our horses and mules are shipped into the state and without any certificate of health, very few cases of glanders are to be found.

Hemorrhagic Septicemia: A number of us have diagnosed this trouble in cattle occasionally from clinical and autopsy symptoms but none so far as I know have been verified by laboratory findings.

Parasites: As naturally to be supposed parasites are very common in the South. The most detrimental are those affecting calves and lambs such as stomach worms, hook worms and nodular disease worms.

Rabies: Among dogs this trouble is very common and several cases in cattle have been observed by the writer. One or two other troubles in cattle, as yet not fully determined from which recovery often occurs, have to be differentiated from it.

The State Laboratory of Hygiene has administered the Pasteur treatment to 1335 patients during the past seven years and to 206 during the past twelve months.

Strangles: As in most every state we have some of this trouble but perhaps because of so little colt raising it is not so common as in the central west.

Tuberculosis: This scourge is to be found in a number of dairy herds and a few other places, yet it is not the menace that it is in many states. Most of the larger dairy herds in the state are now free. Public opinion is causing the milk supply for many towns in the state to come from tubercular-free cows.

Hog Cholera: This disease takes quite a little toll from the state, but it exists very largely only in the eastern free range section where many of the hogs are of little value. During the winter season, and occasionally at other times when hogs are being marketed the disease spreads to the central and mountainous parts of the state.

Influenza: This disease is very common though ordinarily is of little consequence. For the past three years, however, it has been complicated with so called "epizootic-laryngo-tracheitis, and the mortality from such has been very great. A few veterinarians have reported excellent results from the use of guaiacal in glycerine,

Mange: A few cases are to be found in nearly if not all classes of animals. The sarcoptes is rather common in the dog and cat. The demodex is occasionally seen in dog and hog.

Milk Sickness: From the mountain section of the state frequent reports come, that certain coves harbor a trouble called "milk sick" affecting cattle and also people using the milk products of affected cattle. It is still undetermined whether they all refer to a single entity or whether a number of different troubles may not be included in this same category.

Jordan and Harris reported several years ago the finding of a specific organism, *B. lactimobi*, in suspicious cases of milk sickness in New Mexico and in Tennessee, but their findings do not seem to be generally accepted as the causative agent for all cases.

Venereal Diseases of Domestic Animals: For several years past we have been led to believe from investigation and from writings of others that perhaps every class of domestic animal like man had its own venereal diseases. It is quite possible, and perhaps positive, that the infection may enter the system through other avenues than the genital and by other methods than sexual intercourse. The serious results following the infection, however, must involve infection of the genital organs.

Out of several thousand head of cows and unbred heifers observed all over the state during the summer not more than one-half dozen were free from symptoms of granular vaginitis (of vulva). We are inclined to believe that this venereal infection is characterized by the following lesions and symptoms and that few cases occur from other causes: (1) granular vaginitis; (2) abortions (premature births, still births, and births of weaklings); (3) retained fetal membranes and metritis following parturition; (4) sterility, temporary and permanent, requiring more than one service.

Methylene Blue and phenol *per orem* nor the latter hypodermically will be of any service in its control.

Meat and Milk Inspection. Federal Meat Inspection is contemplated at Wilmington, N. C., at an early date.

Municipal Meat and Milk Inspection is maintained at the following places: Asheville, Charlotte, Durham, Fayetteville, Goldsboro, Greensboro, High Point, Kinston, New Bern, Raleigh, Wilmington, Wilson, and Winston. Other places are considering such inspection.

ONTARIO, CAN.

D. McALPINE, Brockville.

It affords me much pleasure to report the prosperous condition of the live-stock interests of Ontario, and the prosperous and contented condition of the veterinarian of the province, which naturally follows in high valuation of stock.

Our contagious diseases are under the control of the Federal Department of Agriculture at Ottawa and the Veterinarian of the Health of Animal Branch has been able to handle in a very efficient manner any outbreak that has existed within the province.

Rabies gained quite a foothold a few years ago but by rigid quarantine and the muzzling of all dogs the officers were able to confine it to a definite area in the western part of Ontario. Hog cholera has made its appearance on several occasions but it too has been stamped out by the same rigid methods. Glanders is very seldom heard of now.

Tuberculosis has the attention of every veterinarian within the province and it is of very great importance to the dairy industry, especially in the northern climate where the cattle are closely housed for six months each year.

Our federal government has seen fit to formulate a plan of co-operating with the municipality in procuring a clean, healthy milk supply. It should be far reaching and do much good in the way of eradicating bovine tuberculosis from the dairy herds. It should be considered by every one having at heart the sanitation of the municipality in Ontario.

We have two associations in the province of Ontario; The Veterinary Medical Association, which meets in the western part and enjoys a large membership, and the Central Canada Association, which meets in Ottawa twice yearly; the C. C. V. A. has a membership of about forty and, from an educational standpoint, has done much for the profession in the East. The mid-winter meeting is divided into reading papers previously prepared by the members and then taking up and discussing the different points pertaining to them.

The mid-summer meeting is a clinic and general discussion tending for the welfare of the veterinarian and, if not enjoying so large a membership as its fellow association in the West, it makes up in enthusiasm.

It is to be regretted that there is not more personal interest displayed by some of the members of the association in the welfare of this work, carried on by the active members and the committees of this association. It is hoped that every veterinarian in the province will feel it his personal duty to become a member; all of which will help to raise the standard of the profession and give the members a better opportunity to become more familiar with the work and also become better acquainted with one another.

OREGON

W. DEAN WRIGHT, Portland.

The veterinarians of Oregon are enjoying an area of prosperity; practice is good; increased consideration is being given the profession, and a number of veterinarians are exerting a dominant influence in executive and sanitary matters. At the election held in 1914, Dr. James Withycombe, a veterinarian, was elected Governor by one of the largest pluralities ever recorded in an Oregon election; the legislature extended the scope of the Live Stock Sanitary Board in that it was empowered with the execution of the Brand Inspection Law.

The city of Portland has been active in the support of veterinary sanitation. A veterinarian is Chief Sanitary Officer of the Portland Board of Health.

A municipal meat inspection ordinance patterned after the federal meat inspection regulations was unanimously passed by the Portland Commission and is now on the city statute books, but its enforcement has been delayed on account of litigation—the supreme court is considering, under appeal, the constitutionality of the ordinance. It seems only a question of time until municipal meat inspection regulations will be operative in Portland. During the discussion of the ordinance, while it was in legislative status, considerable feeling was in evidence. The butchers who conduct small slaughtering plants, with but little regard for sanitary or health conditions bitterly opposed the enactment of legislation that would curb or interfere with their business, but the entire public, with few exceptions, rallied to the support of the ordinance and veterinarians received their just quota of commendation. Publicity was given to most every phase of the inspection of meats and, for the public's benefit, a system of educational enlightenment was conducted

through no small amount of newspaper space being devoted to its consideration and the people as a whole quite well understood and appreciated the benefits derived from a workable municipal meat inspection.

During the Pacific Northwest Live Stock Show a great number of interested people visited a modern abattoir working under the supervision of federal inspectors and took great interest in the explanation of the different phases of the inspection system, while at the same time viewed the exhibit of pathological specimens taken from diseased animals slaughtered in the regular course of the establishment's operations. This gave the public a very vivid and lucid idea of what meat inspection really is and how meat inspection protects the public health by eliminating such meat and meat food products that are detrimental to human consumption.

Through the discussion given the proposed municipal meat inspection regulations, the veterinary profession was thrown in the lime-light of publicity and the attendant results augurs well for veterinarians.

The municipal milk inspection ordinance enacted a few years ago likewise has resulted most favorably to the veterinarians' credit. A small corps of veterinarians are employed in administering the tuberculin test to animals furnishing Portland's milk supply, and in executing sanitary supervision over the production and distribution of Portland's milk. Within the last year 2455 cattle have received the tuberculin test. 233 have reacted and have been isolated from other susceptible animals, 302 tubercular reactors have been slaughtered and of this number 35 have been entirely condemned. The extent of the post-mortem lesions is not so pronounced as in the early part of Portland's milk inspection history. This has been attributed to the frequent inspections that detect the disease before it becomes advanced and the immediate separation of known diseased animals from other dairy stock.

Portland's first milk show proved a decided success. It is estimated that 60,000 people were in attendance and by the dissemination of information concerning the production, distribution and consumption of milk, the milk show acted as the greatest educational factor in furthering the clean milk problem that has ever been offered to the people of Portland. Pertinent milk questions were brought before the public's attention, such as—"The present milk supply", "Pure milk", "Infant mortality and the milk ques-

tion", "The production of clean milk", "Methods of producing milk", "Milk problems in relation to health", "The relation of milk to tuberculosis in human beings", and "What the inspectors do and why". Films and slides were displayed daily at one of the motion picture theatres.

The Pacific Northwest Association of Dairy and Milk Inspectors held their second annual meeting, which was a decided success from every standpoint. Numerous papers dealing with different phases of the milk inspection problem were presented by different members, which were fully discussed. Several papers were read on tuberculosis.

The competitive exhibit of milk from the different municipalities produced no small amount of interest. Portland won the grand prize and carried off more honors than all the other contestants combined in the milk contest held at the Panama Pacific Exposition in San Francisco. The gold medal and the \$100. cash prize were awarded Portland's exhibit. The decision was based on the highest average score for ten regular exhibits of milk. Portland's average was 95.7, and its bacteria count was the lowest of all cities competing.

Milk as a possible carrier of disease was evidenced in the epidemic of typhoid fever that obtained in Oregon City. One-third of all consumers which one dairy company served have fallen victims to the disease. Out of the 117 persons who were on the regular routes of the dairy, 38 cases of typhoid were directly charged to the contaminated water that the dairy used to wash its milk cans.

Rabies has been checked in the vicinity of Portland, due no doubt to the prescribed muzzling of dogs in that vicinity, but in the eastern part of the state, where the infected coyote still proves an uncontrollable menace, the situation is more serious, numerous animals having been sacrificed by the ravages of positive rabid cases.

Oregon is rapidly extending more area to hog raising and the question of cholera is co-existent with the increased hog production. The North Portland Serum Company has erected and now has in operation an anti-hog cholera serum plant adjacent to the Portland Union Stock Yards, Portland, Oregon. This establishment has been of appreciable service in the suppression of this disease. The serum plant, when working to its full capacity, has an output of 60000 c.c. of serum per day, and has distributed 75000 c.c. of serum

per month to the infected areas scattered throughout the different parts of the state.

Sheep scab obtained in a shipment of sheep from Douglas County. The geographical situation in that county is of such a mountainous nature that some sheep practically run wild throughout the year and to collect for effective dipping all sheep in that district is a task of no small magnitude.

Foot-and-mouth disease has not yet been evident within the borders of Oregon, although a stomatitis simulating the infectious foot-and-mouth disease caused some little anxiety at the time. All stock yards and stock pens within the state were disinfected as a precautionary measure.

The Oregon State Medical Association meets annually and has a membership of about 35 veterinarians. At a meeting held in Corvallis, June 9, considerable enthusiasm was evidenced by the various members on account of this association again meeting at a Pacific Coast point that is accessible to most all veterinarians in the Pacific Northwest.

PENNSYLVANIA

F. H. SCHNEIDER, Philadelphia.

The Pennsylvania Act of Assembly approved July 22nd, 1913, is a codification of all former Pennsylvania Livestock Sanitary Laws with sufficient new features to make it one of, if not the best, State Livestock Sanitary Laws in existence. Under it, practitioners of veterinary medicine are required to report to the State Livestock Sanitary Board all transmissible diseases of animals.

The State Livestock Sanitary Board's appropriation for conducting the work for the next two years is \$157,000 less than was allowed for handling the work during the past two years. The state veterinarian was, however, very promptly given all the money asked for to pay bills incidental to foot-and-mouth disease eradication—\$625,000 was appropriated to carry on that important work.

Much has been said and written regarding foot-and-mouth disease and we feel it will be sufficient to mention in this report that there were seven hundred and eighty-eight (788) cases in thirty-four (34) counties. The last case was reported April 25th, 1915, and the state is now free from quarantine.

There have been no serious outbreaks of the ordinary transmissible diseases.

At the present time no funds are available for payment of indemnity for animals condemned to prevent the further spread of transmissible diseases. Heretofore tuberculous cattle, and horses and mules affected with glanders were appraised and paid for by the Commonwealth. The present policy is to quarantine animals condemned on account of the above named diseases if the owner is not willing to destroy them without receiving indemnity.

TUBERCULOSIS. Tuberculin tests are no longer conducted on native cattle at state expense. Quite a few herds are being tested at the owner's expense. The state furnishes tuberculin to approved veterinarians free of charge and all tuberculin tests are required by law to be reported within one week from date of test. All condemned animals are quarantined until disposed of under official supervision.

The new act made some material changes in the then existing law relating to interstate transportation of domestic animals. The state veterinarian is enabled to exercise extensive jurisdiction over interstate transportations and the examination and tuberculin testing of interstate cattle is now being conducted on a much more satisfactory basis than was possible under the old law. About one-half of the imported cattle are tuberculin tested before shipment by federal inspectors or by veterinarians who have been approved by the livestock authorities of their respective states. In case of a suspicious or improper test, the state veterinarian has the authority to refuse such test and order a retest at destination by an agent of the State Livestock Sanitary Board. Cattle which are imported on a permit without examination and tuberculin test, are held in quarantine at destination and tested by a designated agent; the expense of such test is borne by the state. The tuberculin test is compulsory on interstate cattle which are not to be used for immediate slaughter, but it is optional with the owner of a native herd.

GLANDERS was prevalent to a somewhat less degree than usual in the larger cities and with the exception of a chain of cases in Lancaster County, we had very few cases of this disease in the rural districts.

ANTHRAX and **BLACKLEG** were confined to localities in which these diseases have existed for years. There were no new centers of infection. An annual spring vaccination against both of these dis-

eases has been carried out for years with marked success. The losses are kept at the minimum and comparatively few cases of either disease are reported between the annual spring vaccinations.

HEMORRHAGIC SEPTICEMIA has caused fewer deaths in the last two years than in the previous two years. Our laboratory has been prepared to send out a vaccine for the treatment of animals affected with this disease and for the protection of exposed animals. We have not had an opportunity to use this treatment, neither have we had an opportunity to use the permanganate of potash treatment which is reported to have given good results in Germany.

HOG CHOLERA has not exacted the heavy toll that it did in previous years. Pennsylvania has never been heavily infected as compared with the hog raising states, and we, therefore, have been getting gratifying results from the use of the serum alone treatment combined with the enforcement of strict sanitary precautions. Every advantage has been taken to impress upon the stock owners the necessity of the destruction of carcasses of swine that die. They have also been told regarding the necessity of frequently cleaning and disinfecting pens and lots. With the advent of foot-and-mouth disease and the cessation of shipments of livestock, hog cholera practically disappeared. With the resumption of shipping and the holding of public sales, cholera again made its appearance but we have not had anything approaching an epidemic of this disease.

RABIES is reported frequently from various sections of the state but the good effects of the strenuous campaign which was waged in 1911 and 1912 are still apparent. During 1911 rabies was prevalent to an alarming degree in our mining districts and larger cities. That year, and the following one, numerous general quarantines of one hundred days' duration were established and all dogs within the quarantined area found running at large, not muzzled in such a manner that would effectually prevent them from biting, were destroyed by state agents who patrolled the quarantined areas armed with shot guns.

CONTAGIOUS ABORTION causes heavy losses in the dairy districts. Some of our best herdsimen have tried out the various treatments recommended in recent years and feel that the only effectual treatment is strict sanitation. Others report good results from the methylene blue treatment but these men have also carried out the sanitary precautions.

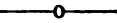
It is an established fact that tuberculosis is disseminated to a

considerable extent by feeding skim milk to calves and swine. The new law provides that creameries, cheese factories, etc., must pasteurize skim milk and separator slop before returning same to patrons for feeding purposes. Considerable opposition has been encountered in the enforcement of this portion of the law both from creamerymen and patrons. It is notable that after a proper system of pasteurization has been installed, all objections are removed and the patrons of a creamery will not accept unpasteurized skim milk. The pasteurization law was aimed primarily at tuberculosis but its value in the control of other diseases is evident. This was amply demonstrated during the recent epizootic of foot-and-mouth disease. A considerable number of infections, involving different creameries, were directly traceable to the use of unpasteurized skim milk. Our new law which pertains exclusively to the health of domestic animals is very comprehensive and has enabled us to handle every phase of this work in a satisfactory manner; but we are greatly handicapped and embarrassed by the deficiency of a law to govern the production and handling of milk for human food. It is generally recognized that this phase of milk hygiene should come under the jurisdiction of the livestock sanitary authorities and should be looked after by veterinarians who have an intimate knowledge of animal diseases and sanitation. Our Livestock Board conducts this important work under a law which was enacted ten years ago and which has not been amended to meet the present day requirements. This law limits the activities of the board to cooperation with local boards of health. Under this plan, continuous inspection of milk supplies has been maintained in a few boroughs and good results obtained; but in general, it is difficult to obtain cooperation with local boards owing to the expense.

Notwithstanding the inadequacy of law, considerable progress has been made in milk hygiene work through a campaign of education involving producer, dealer and consumer. Better results will be obtained after the consumer shall have been made to understand the value of clean milk and demand the enactment and enforcement of proper laws.

The 1915 legislature passed a new meat hygiene law. It is an improvement on the 1907 law, which it repeals. In addition to including the best features of the old law, the new act makes it mandatory upon the butcher to prevent prospective purchasers and all unauthorized persons from touching or handling meat or meat pro-

ducts and to so equip his establishment that meat and meat products will be properly protected from flies, animals or fowls. It makes it unlawful to sell, offer for sale, or to expose for sale, any meat or meat food product from swine to which have been fed any carrion (dead animals). Another point worthy of mention is that it is unlawful to feed offal or slaughter house refuse to swine within a specified distance from an establishment, and finally, any qualified agent of the State Livestock Sanitary Board can serve as agent under it. The old law limited the force of inspectors to ten agents.



TEXAS

R. P. MARSTELLER, College Station.

As resident secretary for the state of Texas, I beg to submit the following report:

Veterinary medicine and sanitation has received greater encouragement during the last two years than it has ever experienced. This is manifested by the wide-spread interest in live stock sanitation. Never before has such great interest been taken in the control of hog cholera, tick eradication and anthrax. At times, during the past years, it seemed that all efforts to arouse the enthusiasm of the people on these important questions were futile, but the earnest efforts of the officers of the Agricultural and Mechanical College of Texas, the Live Stock Sanitary Commission, and the Federal Government have been rewarded.

The preparation of hog cholera serum was begun by the Agricultural and Mechanical College about seven years ago. At first, the public had little faith in it, but, at this time, serum is used effectively in nearly every county in the state. The successful use of hog cholera serum has not only protected a great many hog raisers, but also inspired much public confidence. It was necessary to gain the public confidence, before it could be interested in the importance of sanitary measures in the control of diseases of live stock.

Tick eradication is being carried on by about fifteen counties, and many others are considering holding elections on tick eradication.

The control of anthrax is one of the most perplexing problems, but the public is being impressed with the importance of controlling outbreaks, rather than wholesale vaccination. With the co-

operation of the public, this disease will be under control in a few years.

The thirty-fourth legislature gave the Agricultural and Mechanical College of Texas an appropriation of \$100,000.00 to establish a veterinary college. This, with the present equipment of the veterinary department, should provide ample facilities for starting the freshman class in September, 1916.

The law, regulating the practice of veterinary medicine in Texas, still gives the untrained men an opportunity to practice in Texas. It is noted that public sentiment is rapidly demanding the very highest class service and advice. The qualified veterinarian of regular business method need not fear that his services will not be appreciated and his interests protected.

The Texas Veterinary Medical Association held its annual meeting at College Station, Texas, May 17-18, 1915. It was one of the most interesting and instructive meetings in the history of the association. The following officers were elected:

President, Dr. J. S. Watson, Mexia, Texas.

First Vice-President, Dr. Frank Barnes, Waxahachie, Texas.

Second Vice-President, Dr. W. F. Hayes, Farmersville, Tex.

Secretary, Dr. A. A. Foster, Marshall, Texas.

Treasurer; Dr. J. A. Gossett, McKinney, Texas.

Texas veterinarians are looking forward to the time when it will be their pleasure and good fortune to entertain the American Veterinary Medical Association within the borders of the State of Texas.

UTAH.

H. J. FREDERICK, Logan

Not much has been accomplished along veterinary lines in Utah during the last season. During the last session of the state legislature a new livestock sanitary bill was passed combining the present sheep law and other livestock laws into one and creating a livestock sanitary board to look after all livestock interests. This would have been a great improvement over the existing conditions, but this bill was vetoed by the Governor. Therefore our livestock sanitary situation in Utah is the same as formerly and a long way from being satisfactory. Veterinarians and livestock men are doing the best they can under existing conditions and are determined to

improve them as soon as possible. A new board of veterinary examiners was appointed and quite a number of applicants have taken the state board examination.

The Bureau of Animal Industry has done efficient work in this state in eradicating scabies among sheep and also in running down other contagious and infectious diseases. The veterinary profession is making advancement and also material increase in its members. All veterinarians have been invited to join the A.V. M.A. The State Veterinary Association meets annually for the election of officers and interesting programs are carried out. Other meetings are held occasionally in different parts of the state where the veterinarians of that locality take part.

There are no new diseases prevalent in this state at the present time. During the past spring and summer there has been an epizootic of influenza among horses, in a mild form. Hog cholera has been quite prevalent in some parts of the state during the past year, but this was practically stamped out by applying proper sanitary measures and anti-hog cholera serum. This work was done under the supervision of the Agricultural College Extension Division in connection with its county demonstrators. Black leg still makes its appearance in some localities, but stock men are learning that it is necessary to have their young cattle vaccinated. There have also been a few cases of anthrax and glanders. Abortion still exists, as well as tuberculosis. There are occasionally small outbreaks of forage poisoning or cerebro spinal meningitis. Quite a number of animals die yearly as a result of poisonous plants on our ranges.

The Stallion License Law is being enforced and is doing much to improve the horse industry. There has been a great demand for army horses in this section, and draft stock is constantly sought. Although the motor car is displacing many horses, the demand for horses is greater than ever before.

There are many good dairy herds and we are fast becoming a dairy section, all of which helps the veterinary practitioner.

The Utah Agricultural College is continuing its educational work among the people, instructing them regarding diseases and advising them to call in competent help for their animals when necessary. Quacks are fast disappearing, and qualified men are getting most of the work. Prospects for the future of the veterinary profession in this state seem very good.

WASHINGTON.

J. T. SEELY, Seattle.

By virtue of a bill passed at the last session of the legislature we now have in this state a Department of Agriculture; the head of the department is known as the Commissioner of Agriculture. He has under him three assistant commissioners; one whose duties are with the horticulture division, a second in behalf of pure foods, drugs, oils, etc., and a third to guard the live stock industries.

Dr. H. T. Graves was elected to head the department of dairy and live stock and he is making a very creditable showing in view of the fact that he has been badly handicapped for lack of funds, as the appropriation for this department is insufficient.

In any progressive movement, as a rule, the good things come slowly. The state of Washington for a comparatively new state is doing quite well in legislating in behalf of the live stock interests, but we who are conversant with the actual conditions are aware that we are stopping far short of our goal; it is difficult to convince men, who are not familiar with the live stock situation, that a sizeable appropriation is absolutely necessary in order to combat conditions which come to our attention daily, to say nothing of emergencies.

We hope to see several amendments to our veterinary law at the next session of the legislature that will work to the ultimate benefit of the stock owner, and at the same time give the department explicit power so far as controlling or coping with emergencies.

Hog cholera: there have been several outbreaks of this disease in different parts of the state but it has been handled by the department judiciously and well by the usual methods of quarantine and in some instances with the assistance of serum.

Glanders: this disease makes its appearance from time to time, clinical cases being destroyed immediately and suspicious ones dealt with according to the usual procedure.

Rabies: this disease has given us considerable trouble west of the Cascades, the cities being the principal battle ground, hundreds of cases being reported in dogs; as a rule the dumb form has prevailed with the furious cases the exception; in the neighborhood of fifty people have been exposed and taken the treatment.

The state department was unable to enforce its regulations owing to a weakness in the law, while in the city of Seattle there was

so much agitation that the council would not pass a muzzling ordinance; lobbying was the common thing daily by the sentimental dog fanciers, with the result that the disease gained a foothold and having no power with which to regulate conditions the veterinarians were compelled to use their own discretion in handling the situation.

Tuberculosis: the department is after this disease with as much vigor as their limited appropriation will permit and dairy cattle coming into Washington must be accompanied with a chart showing them to be free from this disease.

It is unlawful to bring stock into this state until they have been examined and found to be free from the following diseases: glanders, farcy, tuberculosis, actinomycosis, rinderpest, foot-and-mouth disease, contagious abortion, contagious keratitis, scabies, maladie du coit, swine plague and hog cholera.

WEST VIRGINIA

L. N. REEFER, Wheeling.

In making my report as resident state secretary for West Virginia, I am delighted to say that, after many useless efforts, we have been rewarded by our state legislative bodies in having passed for us a veterinary practice act. We were obliged to accept it in its patched-up condition or go without any; but we considered that as it is, it is better than none at all. Dr. J. J. Cranwell, Clarksburg, W. Va. is president of the examining board and Dr. W. E. Langford, Martinsburg, W. Va. is its secretary-treasurer.

The West Virginia Veterinary Medical Association held its annual meeting in Parkersburg, W. Va., on July 6th, 1915 and elected as its president, Dr. O. C. Bradley and its secretary-treasurer, Dr. Layne of Huntington, W. Va. After hard work on the part of the Commissioner of Agriculture, Hon. H. E. Williams, we have now a live stock sanitary act, which is being enforced to the letter, and in the future it is hoped that West Virginia will no longer be the dumping ground for diseased animals.

The Proceedings of the Wisconsin Veterinary Medical Association contains 161 pages of papers and discussions given at the first annual meeting held at Madison, January 18-20. The papers are of much interest and the volume is a credit to the association.

SOCIETY MEETINGS

FOURTH JOINT MEETING OF THE CALIFORNIA STATE VETERINARY
MEDICAL ASSOCIATION AND ITS SOUTHERN AUXILIARY, HELD
IN LOS ANGELES, JUNE 21-22, 1916.

When Pres. W. R. Carr called order in the Assembly Room of the Chamber of Commerce, Wednesday, June 21st, 1916, he opened the fourth and largest joint meeting of these associations, and after a short address appreciative of such a full attendance, all eager to take up the program he introduced Mr. John S. Mitchell, President of the Chamber of Commerce.

Mr. Mitchell, in his usual happy manner, welcomed those assembled to the city to which President Roadhouse of the Northern Association, very ably replied.

Dr. R. A. Archibald, President of the Western Laboratories, then read his very able paper on "A Brief Review of some of the Late Developments Along Immunological Lines" which was followed by a most interesting paper on "Hemorrhagic Septicemia" by Dr. J. P. Iverson, Deputy State Veterinarian. The discussion of these papers continued up to the noon hour.

After lunch all took automobiles to "Santa Anita Rancho," the Country Estate of Mrs. Anita Baldwin, which was formerly the home of her father, known to the turf as "Lucky Baldwin". Here Professor J. I. Thompson and Professor Major, present and former Professors of Animal Husbandry, University of California, entertained with demonstrations of Live-stock judging, using the pure bred animals of which there were plenty.

In the evening all met at the Hollenbeck Hotel at the banquet, and every chair prepared was occupied. At the close of the banquet, Toastmaster J. L. Tyler, called on R. A. Archibald, President of the A.V.M.A., who gave us some past, present and he hoped, future, of that association, to which Dr. C. M. Haring, Secretary of the A.V.M.A., also responded.

Dr. L. M. Powers, Health Commissioner of Los Angeles, then read a paper on "Fields for Veterinarians in Preventive Medicine." Other cities have their health officers, but none has one that is a better friend or more appreciative of the veterinarian's services than Dr. Powers, and in his paper he cited many ways by which the departments of food, health, and sanitation could be assisted by the veterinarians.

J. Traum, Bacteriologist, Division of Veterinary Science, University of California, followed with a very complete paper on "Methods of Diagnosing Tuberculosis." His wide experience giving him ample material to take up the various forms of applying the tuberculin test as well as physical examinations. The discussion of this paper consumed the balance of the evening.

The morning session, June 22nd, was opened at the Chamber of Commerce by a paper on "Anthrax Serum and Spore Vaccine", by F. W. Wood of the Veterinary Department of the Cutter Laboratory. This paper was thoroughly discussed, especially by state and county veterinarians present.

L. M. Hurt, Los Angeles County Live Stock Inspector, then read his paper, "Illegal Practitioners and Steps to be Taken to Correct this Evil". This was presented in such a manner as to cross the live wires of discussion to the extent of carrying it over to the afternoon session, which convened at the Hospital of Drs. Carr & Stevens, at 1.30 P. M., for the clinic and conclusion of the session.

The discussion of Dr. Hurt's paper included the County Farm Adviser and higher education for the veterinarian, and a motion was made and passed that resolutions be framed and presented to the Regents of the California State University, urging the establishment of a veterinary school at that institution.

Drs. Archibald and Longley, the two remaining active members of the State Veterinary Examining Board, announced their intention of resigning from that board, and requested that the association take some action calling the attention of the Governor to appointing a new board.

A committee was appointed to draft and present such resolutions.

The publication committee was instructed to publish the proceedings of the meeting and all meetings for the coming year.

At the clinic Dr. G. T. Irons, Inspector in charge, Los Angeles Station U. S. Bureau of Animal Industry, presented an exhibit of pathological specimens found in meat inspection. It was a museum in itself and appreciated by all.

Dr. J. R. Beach from the University Farm, demonstrated the method of preparing and administering chicken pox vaccine, which being a new field, was very interesting to all present.

A cholera pig was procured, and Dr. Bert J. Cady, of the Field Dept. of the Bureau of Animal Industry, posted it calling attention

to the most minute pathological conditions which made it very instructive.

Dr. W. R. Carr operated on a roarer which required the double operation, and this closed the meeting.

J. A. DELL, Secretary.

NATIONAL ASSOCIATION BUREAU OF ANIMAL INDUSTRY EMPLOYEES

The following is a synopsis of some of the business to be transacted at the Third National Convention of the N. A. B. of A. I. E., at New York City, August, 1916:

1. Reports of officers.
2. Considering question of whether or not the N. A. B. of A. I. E. shall publish an official organ.
3. Considering question of amending Article 3, Section 1, of our National Constitution to provide for the Bi-ennial sessions, instead of Annual Conventions.
4. Amending National Constitution to provide for Bureau Employees affiliating with the N. A. B. of A. I. E. through office of National Secretary as members-at-large, in cases where not practicable to form a branch and apply for charter. Such affiliations to entitle members to all the rights and privileges of the association except representation at National Conventions.
5. Considering question of forming a National Ladies' Auxiliary of the N. A. B. of A. I. E.
6. Devising ways and means of increasing the membership of N. A. B. of A. I. E., in order that the moral and financial burden in the struggle for a classification bill may be more evenly distributed among those who would derive benefit from the enactment of same. At present this campaign is being conducted and financed by "the faithful few".
7. Devising ways and means of having all B. A. I. employees affiliated with and cooperate more thoroughly with the National Association of Civil Service Employees, with the view of hastening the enactment of equitable retirement legislation for Civil Service Employees.
8. Amending Constitution to provide that branch secretary in remitting per capita tax shall enclose a list of the names of members covered by the remittance.
9. Considering question of increasing the per capita tax of this association.
10. Election of officers.

J. E. GIBSON, President.

NEW YORK STATE VETERINARY MEDICAL SOCIETY

The twenty-seventh annual meeting of the New York State Veterinary Medical Society will be held in Ithaca, August 2, 3 and 4, 1916.

The program contains the following papers:

Observations on the Treatment of Fistulous Withers

W. J. Wadsworth

Practical Dairy Inspection.....F. D. Holford

Some Common Diseases of the Ear of Small Animals.

H. J. Milks and W. E. Muldoon.

What the Breeder Expects of the Veterinarian....A. L. Brockway

The Raising of Healthy Calves.....W. L. Williams

Treatment of Navicular Disease by Shoeing.....Henry Asmus

Modern Requirements in the Shoeing of Horses for City Use

R. W. Ellis

Further Studies in X-Ray Diagnosis in Veterinary Medicine

Louis Griessman

Remarks on Hog CholeraR. R. Birch

The Requirements of the Physical Examination of Dairy Cat-

tle in Accordance with the Regulations of the State and

City CodesA. Silkman

Exhibition of Greatly Enlarged Kidney and Bile Duct Dis-

tended with Ingesta.....G. S. Hopkins and E. Sunderville

Distribution of Communicable Diseases of Animals by Means

of Common Carriers.....J. G. Wills

On the evening of August 2nd, following a dinner at the Ithaca Hotel a symposium will be held on Laws Regulating Veterinary Practice. The committee on legislation will report at that time and Dr. Augustus S. Downing, Assistant Commissioner of Education of Albany, N. Y., will address the gathering. Senator Morris Halliday and Assemblyman Casper Fenner will also speak.

Dr. C. J. Marshall of the Veterinary College of the University of Pennsylvania will give a lecture during the evening of August 3rd. His topic will be "The Care of the Horse in War". Dr. Marshall has recently made a tour of some of the recent battlefields of Europe. Entertainments are being arranged by the local committee for the ladies in attendance. The outlook now is for a large and enthusiastic meeting.

C. P. FITCH, Secretary.

WASHINGTON STATE VETERINARY MEDICAL ASSOCIATION

The Washington State Veterinary Medical Association met in Mt. Vernon, Washington, on June 21 and 22. The attendance was good although many of the old members who live at a considerable distance did not appear.

It is interesting to note that a large number of veterinarians attended who were not members but every one became a member before he left, and one who could not come sent in his application for membership by telegraph.

This is the first time that every attending veterinarian became a member.

The distinctive feature of this meeting was its discussions. In almost every instance the discussions occupied more time than the papers did. The secretary thinks there was no one present who did not take some part in them. They were marked by a cordial and universal interest that was certainly most gratifying.

The papers read and discussed were: "Control of Bovine Tuberculosis in Washington," "Colics in the Horse," "Case Reports," "Medication of Ruminants," "Hemorrhagic Septicemia in the Skagit Valley" and "Changing Therapeutics." All but the first will appear in the "Proceedings."

Pullman, Wash., June, 1917, was chosen as the place and time for the next meeting.

The officers for the coming year are: president, Dr. E. E. Wegner, Pullman; vice-president, Dr. L. C. Pelton, Enumclaw; sec.-treas., Dr. Carl Cozier, Bellingham.

The clinic was not as good as expected inasmuch as several subjects engaged did not arrive.

CARL COZIER, Secretary.

SOUTHERN TIER VETERINARY MEDICAL ASSOCIATION (NEW YORK)

The second annual meeting of the Southern Tier Veterinary Medical Association was held in Owego, N. Y., July 1st. During the morning a very interesting clinic was held at the Hospital of Dr. E. F. Vorhis, 52 Central Avenue. Drs. J. N. Frost and W. E. Muldoon performed the operations, consisting of one for poll evil and one for roaring.

Dinner was had at the Ah-wa-ga Hotel. At 2:30 P. M. President E. F. Vorhis called the meeting to order. Roll call showed

thirty-five in attendance. After routine business was transacted the program was opened by Dr. J. F. DeVine of Goshen. The title of his remarks was "Some Advantages of Sanitary Precautions in Cattle Breeding". Dr. DeVine gave a very practical talk which was listened to attentively by all present. The next paper was by Mr. E. R. Zimmer, Manager, Farm Bureau of Tioga County. He spoke on the subject of "The Veterinarian and the Farmer". He pointed out that the interests of both were common in many respects and that the veterinarian should educate the farmer as to the proper care and feeding of live stock. Dr. C. D. Pearce of Binghamton read a paper on "Veterinary Dairy Inspection with Special Reference to the Physical Examination of Cattle." Dr. Pearce has had much practical experience in this work and his paper pointed out just what should be done in examining cattle whose milk is to be used by the public.

Each paper was freely discussed and many points of interest brought out. The following officers were elected for the ensuing year: Pres., Dr. C. D. Pearce, Binghamton; Vice-Pres., Dr. L. S. Matthews, Cooperstown; Sec'y-Treas., Dr. C. P. Fitch, Ithaca.

On the invitation of Dr. A. W. Baker and Dr. P. J. Axtell it was voted to hold the next meeting in Binghamton. Nine new members were added to the roll of the association.

C. P. FITCH, Secretary.

CENTRAL NEW YORK VETERINARY MEDICAL ASSOCIATION

The 7th annual meeting of the Central New York Veterinary Medical Association was held at Syracuse, N. Y., June 29th, 1916, with the following members present: Drs. W. G. Hollingworth, Utica; H. A. Turner, Syracuse; W. B. Switzer, Oswego; F. E. York, Earlville; J. A. Pendergast, Syracuse; J. M. Currie, Rome; E. E. Cole, Manlius; A. J. Tuxill, Auburn; J. G. Hill, Geneva; E. E. Dooling, Syracuse; Wilson Huff, Rome; Frank Morrow, Rome; W. M. Pendergast, Syracuse; Wallace Anthony, Poplar Ridge; A. H. Ide, Lowville; J. C. Stevens, Cortland; H. B. Crandall, Syracuse; J. K. Bosshart, Camden; M. W. Sullivan, Marcellus; D. O'Laughlin, Oneida; R. C. Hartman, Pulaski.

A very successful and interesting clinic was the feature of the morning. It was held at the infirmary of Dr. H. A. Turner, at 938 South Salina Street, beginning at 10:00 A. M. The subjects follow:

CASE 1. Black gelding—owned by the Syracuse Fire Department—injury to foot caused by toe clip—Surgeons: Drs. E. E. Dooling, J. A. Pendergast and H. A. Turner.

CASE 2. Gray gelding—bone spavin—cauterized with thermocautery—Surgeons: Drs. Frank Morrow and M. W. Sullivan.

CASE 3. Black mare—tumor in breast—Surgeons: Drs. J. C. Stevens and Roy Webber.

CASE 4. Chestnut gelding—quittor of side bone—Surgeons: Drs. J. K. Bosshart and J. G. Hill.

CASE 5. Black gelding—lameness from side bones—double neurotomy was performed—Surgeons: A. H. Ide and Otto Faust.

CASE 6. Black gelding—double fistulae of withers—Surgeons: Drs. W. M. Pendergast, F. E. York and J. K. Bosshart.

CASE 7. Brown gelding—trephining for ulcerated tooth—Surgeons: Drs. H. A. Turner and J. A. Pendergast.

CASE 8. Black mare—acute indigestion—stomach washed out and trochar and canula inserted—results favorable—treated by Drs. J. G. Hill and J. A. Pendergast.

CASE 9. Roan mare—acute indigestion—treated by Drs. H. A. Turner and J. A. Pendergast.

CASE 10. Black gelding—owned by the Syracuse Fire Department—foot operation—Surgeons: Drs. J. G. Hill and J. A. Pendergast.

CASE 11. Black gelding—quittor—Surgeons: Drs. J. K. Bosshart and J. G. Hill.

The committee on arrangements had provided several other cases but owing to lack of time it was impossible for attention to be given thereto. Lunch was served at the infirmary during the progress of the clinic.

The business session was held at the St. Cloud Hotel, being called to order by Dr. E. E. Dooling, president of the association. Dr. Otto Faust, of Poughkeepsie, President of the New York State Veterinary Medical Society, Dr. Roy Webber of Rochester, member of the Genesee Valley Veterinary Medical Association and Dr. O. P. Jones of Manlius were present as guests. At the close of the meeting the application of Dr. Jones for membership was received.

The President's address embodied very profitable suggestions relating to preparedness for future clinics.

The secretary-treasurer, W. B. Switzer, reported verbally as to the secretarial work of the year and submitted a financial report

showing a balance in the general fund of \$87.35, in addition to the sum of \$85.90 held in a special fund for the protection of members from malpractice suits. Both reports were approved.

The officers elected for the ensuing year were: president—Dr. Frank Morrow, Rome; vice-president—Dr. W. M. Pendergast, Syracuse; sec.-treas.—Dr. W. B. Switzer, Oswego; Censors—Dr. H. A. Turner, Syracuse; Dr. J. M. Currie, Rome; Dr. J. C. Stevens, Cortland; Dr. A. H. Ide, Lowville; Dr. W. L. Clark, Seneca Falls; Dr. W. G. Hollingworth, Utica.

Owing to the lateness of the hour the reading of papers was dispensed with. It was decided to open future clinics at 9:00 o'clock, A. M., to provide more time for the business session and papers.

A permanent committee on arrangements, to consist of Syracuse veterinarians was decided upon, with Dr. E. E. Dooling as chairman, he to appoint his own assistants. Drs. Turner and J. A. Pendergast were selected by the chairman.

It was also resolved that at future meetings all members shall provide themselves with their own suits and instruments to be used at the clinic.

Dr. Faust was called upon and responded very courteously, complimenting the members on the clinic of the morning and discussing the new state law legalizing the registration of some eight men and also opening a discussion on the Harrison law relative to narcotics. This last law was reported by Dr. Hollingworth to have been held unconstitutional in its application to physicians and veterinarians and to apply only to druggists and those dealing with narcotics commercially.

Dr. Webber also spoke briefly, telling how he dealt with the problem presented by the new law on narcotics.

Papers for the November meeting were offered as follows:

Dr. J. A. Pendergast..... Case Reports
Dr. A. L. Danforth..... Wounds of Feet
Dr. D. O'Laughlin..... (To report subject later)
Dr. A. H. Ide..... Umbilical Hernia
Dr. J. C. Stevens..... Respiratory Diseases
Dr. M. W. Sullivan, Rupture of Pre-pubian Tendon of Cow

This closed the business session. Dinner followed at the St. Cloud, of which 13 of the members and visitors partook.

This meeting marks the close of the seventh year of the existence of this association. We believe few societies of the profession can point to a more enviable record than that which we have made during the years since our organization. Sustained interest on the part of the members, the power to attract the interest of the leading men of the profession throughout the state to the end that our meetings may be made more profitable, these are our great achievements. We feel that what we have accomplished in that respect proves the value of the work we are doing. Every Central New York Veterinarian should be with us, both for his good and for the good of the profession.

W. B. SWITZER, Secretary.

KENTUCKY VETERINARY MEDICAL ASSOCIATION

At a recent meeting of the Kentucky Veterinary Medical Association, the following officers were elected: President, Dr. Alex. Harthill, Louisville; First Vice-President, Dr. M. A. Purdy, Shelbyville; Second Vice-President, Dr. H. K. Ditto, Pleasureville; Third Vice-President, Dr. J. T. Chawk, Louisville; Secretary and Treasurer, Dr. D. E. Westmoreland, Owensboro. Our next meeting will be held at the Kentucky State Fair Grounds on September 14.

D. E. WESTMORELAND, Secretary.

SECOND PAN-AMERICAN SCIENTIFIC CONGRESS

At the second Pan-American Scientific Congress the following recommendations were made:

a. Each country should maintain a well-organized and competent live-stock sanitary service comprising executive officers, field inspectors, and a laboratory force;

b. Each country should enforce live-stock sanitary laws and regulations with the view of preventing the exportation, importation, and spread within the country of any infectious, contagious, or communicable animal disease by means of animals, animal products, ships, cars, forage, etc.;

c. Each country should maintain a thorough live-stock sanitary survey to determine what communicable diseases of animals are present and the localities where they exist. This information should be furnished regularly to each of the other countries at stated periods as a matter of routine;

d. Each country should refrain from exporting animals, animal products, forage and similar materials which are capable of conveying infectious, contagious, or communicable animal diseases to the receiving country;

e. Each country should enforce measures to prohibit the importation of animals, animal products, forage, and other materials which may convey diseases from countries where dangerous communicable diseases such as rinderpest, foot-and-mouth disease, and contagious pleuropneumonia exists, and which have no competent live-stock sanitary service. Animals, animal products, forage and similar materials from countries maintaining a competent live-stock sanitary service may be admitted under proper restrictions, regulations, and inspection, imposed by the importing country.

f. Each country, through its live-stock sanitary service, should endeavor to control and, if possible, eradicate the communicable animal diseases existing therein. There should be an exchange of information as to the methods followed which have proved most successful in combating animal diseases;

g. Members of the live-stock sanitary service of each of the American Republics should meet at regular intervals to consult and inform each other regarding the measures taken for furthering co-operation in protecting the live-stock industry of the American countries.

The annual report of the chief veterinary officer (Sir Stewart Stockman) of the Board of Agriculture and Fisheries, Great Britain, for 1915, contains references to foot-and-mouth disease; swine fever; swine erysipelas; tuberculosis in swine; glanders; anthrax; sheep scabs and rabies. Towards the end of 1915 a serious outbreak of foot-and-mouth disease occurred in the south-west of England. The number of animals slaughtered as affected or to prevent further spread of the infection was 1,267 cattle, 482 sheep, 382 pigs and 1 goat. The original source of infection was not discovered. A case of rabies developed in an imported Irish terrier during its period of quarantine at one of the premises authorized for the detention of imported dogs.

House Resolution No. 253 by Mr. Hull of Iowa provides for adopting the decalogue and Jesus Rules as standard measures for laws and regulations of the Government of the United States.

REVIEWS

A TEXT-BOOK OF MEAT HYGIENE. WITH SPECIAL CONSIDERATION ON ANTE-MORTEM AND POST-MORTEM INSPECTION OF FOOD PRODUCING ANIMALS.

RICHARD EDELMANN, Ph.D., Medical Veterinarian, High School, Dresden.

Third Revised English Edition and authorized translation revised for America. By John R. Mohler, A.M., V.M.D., Assistant Chief, U. S. Bureau of Animal Industry and Adolph Eichhorn, D.V.S., Chief Pathological Division, U. S. Bureau of Animal Industry. Octavo 452 pages, with 161 illustrations and 5 colored plates. Cloth \$4.50 net, Lea and Febiger, Publishers, Philadelphia and New York, 1916.

The third edition of this deservedly popular book will be welcomed by all who have to do with the inspection of meat or meat products. The German text of Edelmann's *Meat Hygiene* was closely followed in the two previous editions but in this, the third edition, all reference pertaining to German conditions especially in regard to the disposal of diseased animals has been disregarded. This book as now presented, is based strictly on the rules governing meat inspection as formulated by the Bureau of Animal Industry. It will, therefore, be of greater value to those in this class of work in the United States.

The subject matter has been divided into fifteen chapters each of which treats of an important phase of inspection work. The method of arrangement of the text is excellent and deserves special commendation. It is especially good from a pedagogical standpoint and also permits of ready reference. The book has been brought up to date in regard to the pathology of the various diseases and several new diseases have been included in this edition. In the final chapter the authors have added information concerning the practical side of meat inspection with special reference to the preparation and inspection of meat-food products such as the Curing of Pork and Beef, Sausage Making, Manufacture of Lard, etc. Much interesting and valuable information is here presented.

This is an excellent book and should have a wide circulation.

C. P. F.

NECROLOGY

PAUL PAQUIN

Dr. Paul Paquin died, at the age of 55, June 22, in Christian Church Hospital, Kansas City, Mo., of tubercular meningitis. He graduated from the Montreal Veterinary College in 1883 and later (1887) graduated from the University of Missouri at Columbia. He obtained the degree of M.D., and for several years was professor of comparative medicine at Columbia, Mo. He was state veterinarian for a time and wrote extensively on his investigations in the diseases of live stock, and produced a serum from the blood of asses for the treatment of human tuberculosis. He, later, devoted himself to human medicine; published a quarterly journal—the Bacteriological Index, and was secretary of the Missouri State Board of Health from 1896 to 1899. For a time he was a resident of Asheville, N. C. At the time of his death he was director and executive officer of the Hospital and Health Board of Kansas City.

JOHN FRAZIER

John Frazier was a native of Ireland, 88 years of age. He was said to be the oldest registered non-graduate practitioner in Western Pennsylvania. His death occurred July 8, at his home in Butler, Pa.

JOHN JOSEPH GALLAGHER

Dr. John Gallagher, of Lovelock, Nevada, died at San Francisco, California at the age of forty years, following a nervous breakdown. Dr. Gallagher was a graduate of the New York State Veterinary College at Ithaca, N. Y. He was sheep commissioner of the state of Nevada and had extensive mining interests.

MISCELLANEOUS

Dr. Paul R. King, formerly of Kansas, is now stationed with Remount No. 2, at Fort Sam Houston, Texas. About 6000 head of horses and mules are on hand and additional supplies of about 600 a day are being received. Influenza, with its complications, is the disease requiring most attention.

The twenty-second annual meeting of the Missouri Valley Veterinary Association was held at the Hotel Castle, Omaha, Neb., July 10, 11, 12.

The ninth semi-annual meeting of the Genesee Valley Veterinary Medical Association was held at Tegg's Veterinary Infirmary, Rochester, N. Y., July 13.

Dr. A. B. Niven, after nearly fifteen years' service in the Bureau of Animal Industry, has resigned and entered practice at Crawfordsville, Indiana. His former address was Henderson, Ky.

The U. S. Department of Agriculture has issued the Reports of Drs. Verantus A. Moore, Mazyck P. Ravenel and William T. Sedgwick upon the federal meat inspection as circular No. 58. The reports commend much of the work that is being done and offer suggestions for further improvement, some of which have already been acted upon.

Doctors J. D. Moore of Albion, N. Y. and J. W. Ardell, of Atlanta, N. Y. have been engaged in army veterinary service work at the Training Camp at Tobyhanna, Pa. They have the rank of Second Lieutenants.

A BOARD OF VETERINARY EXAMINERS FOR PORTO RICO. The Legislative Assembly of Porto Rico has enacted a bill providing for a board of veterinary examiners. The bill provides for the appointment of "three skilled and capable veterinarians who shall be graduates of colleges of good reputation, etc." The veterinarians so appointed are to hold office for five years. The board will accept only those candidates for examination who have diplomas from the colleges recognized by the A.V.M.A., and Bureau of Animal Industry. Juan Varas Catalá, Ohio State University, 1910, is a member of the board. Porto Rico is to be congratulated on the progressive step that has been taken.

Dr. C. J. Marshall gave an address on "Observations on Army Veterinary Hospitals and Systems Abroad", at the last meeting of the Alleghany Veterinary Club.

The third National Convention of the National Association of Animal Industry Employees will be held in New York City, Monday, August 14. The Hotel McAlpin, Greeley Square, 34th Street and Broadway, will be the convention headquarters. Congressman Lobeck will be a guest of the convention. Other prominent officials have been invited.

The Report of the Practitioners' Short Course held at Ames, Iowa contains a number of interesting and important articles. The illustrations are numerous and excellent.

The marriage of Miss Gladys Howell Warrick of Cayuga, N. Y. and Dr. W. W. Williams of Ithaca, N. Y. has been announced. The ceremony occurred July 1, at Yonkers, N. Y.

The veterinary inspectors classification bill was introduced in the U. S. Senate June 22, by Senator Hitchcock and on the 27th by Senator James Hamilton Lewis. The bills are identical and all Bureau employes are urged to write to their senators urging them to support the bills.

It is also urged that veterinary colleges; alumni associations; state and county veterinary societies and veterinary students write their congressmen and senators to enlist their support.

The number of employes in the Bureau service on June 1, 1916, who would benefit by the passage of these bills, which are the same as the Lobeck bill, are 3150.

The Report of the Bureau of Biological Survey on the Rabies Eradication Campaign in the State of Nevada, calls attention to the fact that while no accurate figures are available, it can safely be said that predatory animals and rabies have destroyed a quarter of a million dollars worth of live stock in Nevada since last September, when the disease first attracted serious attention.

In the effort to combat the spread of rabies, the Biological Survey now has about 143 hunters in Nevada. These men are devoting their time to poisoning, trapping, and den-hunting coyotes, bobcats and other predatory animals, which are largely responsible for the spread of rabies, in addition to the havoc which they annually work among the live stock of the western ranges.

Cooperating in the work is the Nevada Rabies Commission which is composed of Governor E. D. Boyle, Dr. W. B. Mack, Mr. J. H. Clemmons, Mr. George Russell, Jr., and Mr. W. M. McGill.

Laws of Ohio Regulating the Practice of Veterinary Medicine and Surgery provide that the board of agriculture shall appoint three men who shall constitute a state board of veterinary examiners, one to be appointed for two years, one for four years and one for six years, and biennially thereafter one shall be appointed to serve for a term of six years. They must be graduates of reputable, but different, veterinary colleges and be persons skilled in their profession and of good moral character. The state veterinarian shall be ex-officio a member and secretary of the board. Examinations will be held in April and July of each year. The secretary is also to report violations of the laws. Applicants must be graduates of colleges recognized by the board of examiners.

The law also provides that any person who, within six months after the act becomes effective, submits satisfactory evidence to the board of examiners that he was engaged in the practice of veterinary medicine and surgery in the state prior to May 21, 1894, and who pays a fee of \$2.50, shall be entitled to practice in the state and shall receive a certificate to that effect.

The certificate of a veterinarian may be revoked: for failure to report dangerously contagious and infectious diseases that are prescribed as such by the board of agriculture; for dishonesty in applying the tuberculin test in cattle, such as injecting tuberculin within six weeks prior to an official tuberculin test, knowing that application has been made for such official test, or making false record of such test; gross malpractice or violation of criminal laws.

Whoever engages in the practice of veterinary medicine or surgery in violation of any provision of law, shall be fined not less than ten dollars nor more than twenty-five dollars, and for each subsequent offence shall be fined not less than fifty dollars nor more than one hundred dollars or imprisoned in jail not more than sixty days or both. The present board of examiners consists of: Dr. Reuben Hilty, president; Dr. C. W. Fogle; Dr. J. D. Fair, and Dr. A. S. Cooley, secretary, ex-officio.

DIRECTORY OF STATE VETERINARY OFFICERS

Alabama	C. A. Cary	State Veterinarian	Auburn
Arizona	W. E. Severn	" "	Phoenix
Arkansas	R. M. Gow	" "	Little Rock
California	Chas. Keane	" "	Sacramento
Colorado	Chas. G. Lamb	" "	Denver
Connecticut	Hon. J. O. Phelps	Comm'r on Domestic Animals	Hartford
Delaware	H. P. Eves	Sec'y State Live Stock Sanitary Board	Wilmington
District of Columbia	A. D. Melvin	Chief, Bureau of Animal Ind.	Washington
Florida	W. C. Woodward	Health Officer	Washington
	Chas. F. Dawson	Veterinarian, State Board of Health	Jacksonville
Georgia	Peter F. Bahnsen	State Veterinarian	Atlanta
Idaho	H. G. Bodle	" "	Boise
Illinois	O. R. Dyson	" "	Springfield
Indiana	A. F. Nelson	" "	Indianapolis
Iowa	J. I. Gibson	" "	Des Moines
Kansas	J. H. Mercer	State Live Stock Sanitary Commissioner	Topeka
Kentucky	S. F. Musselman	State Veterinarian	Frankfort
Louisiana	R. Pegram Flower	Executive Officer, State Live Stock Sanitary Board	Baton Rouge
Maine	Boyden Bearce	Live Stock Sanitary Comm'r	Augusta
Maryland	L. Hickman	Chief Veterinary Inspector	Baltimore
Massachusetts	Lester H. Howard	Comm'r of Animal Industry	Boston
Michigan	Geo. W. Dunphy	State Veterinarian	Lansing
	H. H. Halladay	Pres. Live Stock Sanitary Commission	Lansing
Minnesota	S. H. Ward	Executive Office Live Stock Sanitary Board	St. Paul
Mississippi	E. M. Ranck	State Veterinarian	Agricultural College
Missouri	D. R. Luckey	" "	Columbia
Montana	W. J. Butler	State Veterinary Surgeon	Helena
Nebraska	J. S. Anderson	Deputy State Veterinarian	Lincoln
Nevada	W. B. Mack	State Quarantine Officer	Reno
	J. J. Gallagher	Executive Officer of the State Sheep Commission	Lovelace
New Hampshire	Andrew L. Felker	Commissioner of Agriculture	Concord
New Jersey	Jacob C. Price	Sec'y State Board of Health	Trenton
	Franklin Dye	Sec'y Commission on Tuberculosis	Trenton
New Mexico	W. J. Linwood	Sec'y Cattle Sanitary Board	Albuquerque
	R. H. Crews	Sec'y Sheep Sanitary Board	Albuquerque
New York	J. G. Wills	Chief Veterinarian	Albany
North Carolina	B. B. Flowe	State Veterinarian	Raleigh
North Dakota	W. F. Crewe	" "	Bismarck
Ohio	A. S. Cooley	" "	Columbus
Oklahoma	F. M. Gault	Pres. State Board of Agri.	Oklahoma City
Oregon	W. H. Lytle	State Veterinarian	Salem
Pennsylvania	C. J. Marshall	" "	Harrisburg
Rhode Island	John S. Pollard	" "	Providence
South Carolina	R. O. Feeley	" "	Clemson College
South Dakota	A. E. Beaumont	Sec'y State Live Stock Sanitary Board	Pierre
Tennessee	M. Jacob	State Veterinarian	Nashville
Texas	E. F. Jarrell	Chairman Live Stock Sanitary Commission	Fort Worth
	J. H. Avery	State Inspector	Fort Worth
Utah	A. Carrington Young	Sec'y State Board of Sheep Commissioners	Salt Lake City
	A. A. Callister	Live Stock Commissioner	Salt Lake City
Vermont	F. L. Davis	State Veterinarian	White River Junc.
Virginia	J. G. Fernyough	Commissioner of Agriculture	Richmond
Washington	J. H. Perkins	Commissioner of Agriculture	Olympia
West Virginia	H. E. Williams	State Veterinarian	Charleston
Wisconsin	O. H. Eliason	" "	Madison
Wyoming	B. F. Davis	Sec'y State Board of Sheep Commissioners	Cheyenne
	H. R. Millard	" "	Cheyenne

JOURNAL

OF THE

American Veterinary Medical Association

Formerly American Veterinary Review
(Original Official Organ U. S. Vet. Med. Ass'n)

PIERRE A. FISH, Editor

ITHACA, N. Y.

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The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

VOL. XLIX. N. S. VOL. II. SEPTEMBER, 1916.

No. 6.

Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary L. A. Merrillat, 1827 Wabash Ave., Chicago, Ill. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

THE ANNUAL MEETING AT DETROIT

The indications for a successful meeting were evident from the start. At the opening exercises there was some disappointment at the non-appearance of Governor Ferris and Mayor Marx, who were to deliver the addresses of welcome. Official duties were responsible for this; Mr. Lee appeared as the representative of the Mayor and delivered a well chosen and hospitable address. This was responded to in an appropriate and agreeable manner by Dr. Tait Butler of Memphis, Tennessee on behalf of the association. To demonstrate that his interest in the veterinary profession was more than a perfunctory one, Governor Ferris came to the association headquarters Tuesday evening and entertained the members with an address which, with numerous humorous allusions, showed his appreciation of the relation of the veterinary profession to the commonwealth, the progress it has attained and the importance of a sound educational foundation preliminary to veterinary training. Dr. J. G. Rutherford of Calgary, Canada, whose oratorical ability has been well tested on numerous similar occasions, followed with a speech which ably supplemented that of the Governor and conveyed the thanks and good will of the members for the interest

and trouble taken by the Governor to keep his belated engagement.

Social entertainment was afforded Monday evening by a reception and ball. Tuesday evening there were various alumni suppers and gatherings in addition to the Governor's address. On Wednesday evening a very enjoyable banquet was held in the ball room. Dr. Dunphy officiated very acceptably as toastmaster. This list included remarks by Dr. W. Horace Hoskins, Dr. Tait Butler, Dr. Kedzie, Dr. W. H. Dalrymple, Dr. J. G. Rutherford, Dr. E. M. Ranck, and Dr. J. W. Adams. The speeches were entertaining and uniformly brief. Entertainment was provided for the ladies by a sight-seeing trip of the city, including Belle Isle and a very enjoyable theatre party. On Thursday the association was the guest of the Parke, Davis Co. The company was a bountiful host. After conveying the members and friends by boat to their manufacturing plant, numerous guides were furnished to pilot the visitors through the various departments. There was much to interest and instruct. The remainder of the day was spent in a boat ride up the river into Lake St. Clair, on the steamer *Britannia*. Boxes containing an appetizing lunch were served on steamer to 1000 or more guests. The bounty of the hosts will long be remembered by those fortunate enough to be present.

The papers on the program were of timely interest and importance and received appropriate discussion. Undoubtedly the greatest interest centered around the business session of Thursday evening, at which the new officers were elected and the report of the Committee on Reorganization was presented. Dr. C. E. Cotton of Minneapolis was elected president without opposition. The vice-presidents chosen were: Doctors G. W. Dunphy, Michigan; F. A. Bolser, Indiana; S. Hadwen, Canada; V. A. Moore, New York; L. H. Howard, Massachusetts. There was some rivalry for the secretary's office. The names of Doctors Merillat and Mayo were presented. Dr. Haring announced that he was not a candidate. The vote turned in favor of Dr. Merillat and upon motion of Dr. Mayo his election was made unanimous. Dr. Schneider was re-elected treasurer and Dr. Frost librarian.

The report of the committee on reorganization aroused animated discussion. A report, so comprehensive in scope involving some new and untried features, is naturally susceptible to criticism. It was the endeavor of the committee, as announced by Chairman Cary, to profit as much as possible from the efforts of

former committees without losing sight of whatever merit was possessed by the old constitution. As previous notice had been given, the report was presented for adoption at the Detroit session. Dr. Campbell, of Chicago, submitted to the members printed copies of a pamphlet on "A Plan for Reorganizing the American Veterinary Medical Association" based upon his service on previous committees. An amendment to the report offered by Dr. Klein, to the effect that the curriculum of twenty-eight months, involving four collegiate years, should go into effect in 1916-1917 instead of 1917-1918, was passed by the association. Much of the debate centered around the requirement of one year's high school work or its equivalent in studies taken in other preparatory schools. The report was adopted.

Among the new features is a member at large on the executive board to be elected at an annual meeting, the other five members being elected by mail ballots from districts based on geographical arrangement. The former honor roll was omitted and these members, like all active members, will hereafter pay their annual dues. To replace the honor roll and as a recognition of long and faithful service, the former honor roll member is to be designated as a Fellow of the A.V.M.A., a certificate to that effect being issued by the secretary.

The executive committee, formerly appointed annually, is to be replaced by an executive board to be nominated and elected by mail ballot from five districts, each district to elect its own member. In addition there is to be a member at large elected by the association at an annual meeting, making a board of six members. The term of office of each member is five years; so that, after the plan is organized, one member will drop out each year and a new one elected by the constituents of the given district. This arrangement gives greater continuity of service and should promote efficiency and yet arranges for the introduction of new blood from one of the districts annually. The chairman is to be elected by the members of the board.

A new feature is a committee on budget. This is to consist of the president, secretary, treasurer and chairman of the executive board, those most familiar with the financial condition of the association. The function of this committee is largely to keep the expenditures within the income.

The committees on intelligence and education, and legislation are arranged for continuity of service similarly to the executive board, except that the members of these committees are appointed by the president. After organization one member will drop out each year and the president will appoint his successor for a term of five years.

Although it was voted at the Oakland meeting that the annual dues should be increased to five dollars, a point had arisen, which questioned the correctness of the action. On this account notices for the 1916 dues had not been sent out by the secretary previous to the meeting. The matter was decided in favor of the \$5.00 dues. The fact that the treasurer's report showed a balance on hand of \$1349.00 with the 1916 dues as yet uncollected, and while the association was still on the basis of three dollar dues, reflects much credit upon the efficiency of the outgoing administration.

The possession of a balance or reserve fund is necessary for the success of any organization but it also has its dangers. If more money should, perchance, be available, more methods may be devised for dissipating it. A successful organization is measured more satisfactorily by the results accomplished rather than by the amount of money it can spend. Under all conditions it is desirable that there should be suitable ballast to keep the ship of state properly balanced.

Approximately 400 members, 300 visiting veterinarians, and 275 ladies were in attendance, a total of nearly 1000.

The association received invitations to hold its next meeting at Mobile, Alabama, and Kansas City, Mo. The claims of each were eloquently presented.

Dr. Archibald, Secretary Haring and the other officers are to be sincerely congratulated on the success of their administration. Much effort has been expended in making this one of the most successful meetings in the history of the association both in attendance and in the results accomplished. The new administration will have new problems to solve, new difficulties to overcome. We know their standard is progress and with the proper cooperation of the members every effort will be made to maintain the standard that has been set, and, if possible, advance it.

P. A. F.

THE STERILITY OF THE FREE-MARTIN

When twins of different sexes are born of cattle the female is called a free-martin. In rare instances cases of normal fertility have been recorded but the general experience of breeders for some centuries past has been that such female twin is sterile. Statistical evidence has not been abundant and such as there is, is not exempt from confusion.

Twins may be produced from a single ovum "identical twins" in which case they are always of the same sex, or they may be produced from separate ova, in which case they may be either of different sexes or of the same sex. In any case if the twins are of the same sex (homosexual) they are likely to be fertile, but if of different sexes (heterosexual) it is the female which is barren, except in rare instances, in the case of cattle. Statistics do not throw much light upon the causes which produce the free-martin. These must be sought from the embryological side.

In a recent paper by Dr. F. R. Lillie (Science, April, 1916) some interesting facts are presented which appear to offer a rational basis in this matter. He has examined forty-one cases of bovine twins *in utero* and found fourteen homosexual males, six homosexual females and twenty-one heterosexual twins: the sum of the homosexual being about equal to the heterosexual twins.

If the sterile free-martin and its masculine mate could arise from a single ovum they should be included in a single chorion and there should be but a single corpus luteum present. If they arise from separate ova we should expect two separate chorions and two corpora lutea. The condition of a single chorion, however, he does not consider a conclusive test of origin from a single ovum as two chorions originally independent may fuse secondarily. The observations in his forty-one cases showed that about 97.5 per cent of the bovine twins possessed a single chorion, but in spite of this condition nearly all of the twins developed from separate ova. The basis for this belief is that he found a corpus luteum present in each ovary. In normal single pregnancies in cattle there is never more than one corpus luteum present. He believes therefore that in cattle a twin pregnancy is almost always a result of the fertilization of an ovum from each ovary. Development begins separately in each horn of the uterus. When the embryos meet in the cavity of the uterus, the blood vessels from each side

then anastomose in the connecting part of the chorion; a particularly wide arterial anastomosis develops, so that either fetus can be injected from the other, the arterial circulation of each also overlaps the venous area of the other, so that a constant interchange of blood takes place. If both are males or both are females, no harm results from this; but *if one is male and the other female, the reproductive system of the female is largely suppressed, and certain male organs even develop in the female.* This result he believes is unquestionably to be interpreted as a case of *hormone action*. (A hormone is a substance which is capable of exciting chemically other substances.) It is not yet determined whether the invariable result of sterilization of the female at the expense of the male is due to more precocious development of the male hormones or to a certain dominance of male over female hormones.

Steinach's experiments in changing the sexual characteristics of young rats by the implantation of parts of the sexual apparatus from the opposite sex appear to have a confirmatory bearing upon this view.

It is reported that sterile free-martins are very rarely found in sheep. In four twin pregnancies in sheep examined by Lillie, he found in each instance a single chorion for each fetus and that each had developed from different ova; the circulation was therefore confined to each fetus.

Fundamentally, then, the conclusion seems to be that when the twins are of different sexes and the chorions fuse and the circulations of each fetus overlap, the female results in a sterile free-martin, because of the male hormones. This condition is more common in cattle. If the chorions do not fuse and the circulation of each fetus is closed, then the female is fertile. This condition is more common in sheep.

In the very exceptional cases in cattle where the female of the heterosexual twins is fertile, it is to be assumed that the chorion and circulation for each fetus remained separate, as is usually the case in sheep.

P. A. F.

The marriage of Miss Anna Lisabeth Corwin and Dr. John McCartney is announced. They will be at home at "The Franklin," Middletown, N. Y., after Oct. 1,

EUROPEAN CHRONICLES

Bois Jerome.

GLANDERS IN MAN.—It is very fortunate that the contagion of this disease to human beings is of very rare occurrence, and when such takes place and a veterinarian is the victim, the fatal end is generally recorded. Sometimes a full and long description of the sufferings of the patient are given in, at least, the professional papers and yet in other cases the sad news is scarcely mentioned or perhaps treated briefly in an obituary.

Cases of recovery from an attack of glanders in man, when the nature of the disease has been established in a positive manner, have not, I believe, been recorded. Years ago there was a report of one recovery spoken of and published in the pages of the *American Veterinary Review*. But unless I am in error, this is the only one I can allude to.

For these reasons, I confess to neglect in overlooking the authentic case described in the *Journal of Comparative Pathology*, in 1913.

In the March number of this year of the same *Journal* the case is *de novo* brought before the attention of the readers and this time I will notice it.

In 1913 Mr. S. H. Garger, M.R.C.V.S., then in the military service in India, reported the full history of an infection with the *Bacillus mallei* from which he had suffered. At that time he thought it had terminated in recovery after a series of suffering and various manifestations, lasting a period of two years and four months.

The main features of this first attack as published were: ((a) "Infection occurred by way of the alimentary canal: (b) a period of three weeks elapsed before the disease became visibly localized, during which time there was high fever and rheumatic pains and a diagnosis was impossible: (c) the disease localized itself in the left hand, after a slight blow: an acute infection setting in by way of the lymphatics with the hand lesion as its starting point: (d) this acute lymphatic invasion was overcome and a chronic form of disease supervened, frequently aggravated by unavoidable surgical interference: (e) an occasional blood infection occurred, causing lesions in remote regions of the body, such as the right wrist, and left ankle, these then forming new centers from which the disease developed locally, and from which it was conveyed by way of the

lymphatics to groups of glands nearer the body: (f) the larger number of the lesions were connected with the lymphatic system, either in the glands or on the course of the vessels, their predilection seat being the neighborhood of joints, the ankle, wrist and knee especially: (g) the disease lasted for a period of nearly twenty-eight months and nearly proved fatal on two occasions, namely, during the first acute attack and at a critical period a few weeks after the left arm was amputated: (h) the total number of operations was forty-five, of which twenty-seven were done under chloroform: (i) the treatment was surgical, vaccinal and general."

After such a terrible experience the author considered himself cured because of the sound healing of all the local lesions, the disappearance of all traces of inflammation, the gradual whitening of the scars, the return of almost complete freedom of movement in all the parts affected and the complete return of a former fit condition and an increase of weight to above the normal.

But all of these were subservient to an essential condition it seemed, namely: that the defences of the body should not become weakened by another attack of some disease.

Garger was still in India and an attack of malaria developed and then, the apparent recovery from glanders, considered complete in June, 1912 and which had lasted until the middle and latter part of February, 1914, disappeared as manifestations again became evident. Garger was again admitted to the hospital on March first. A period of a little over seven months had elapsed between the two attacks of glanders.

Then began a long series of various symptoms of suppurations, of synovitis, of periostitis and necrosed bones, of rebellious nasal hemorrhages, of neuralgia, of formation of abscesses demanding several surgical interferences, etc.

The manifestations of temperature varied from day to day and accordingly the developing of the lesions. As to the form of treatment followed, this was altogether according to the indications and certainly these were many if one reads of the great variety of drugs which were administered or applied: soothing lotions, dressing with tincture of iodine, applications and injections of peroxide of hydrogen. Internally, purgatives, calomel, arsenic, aspirin, exalgine, phenacetine, caffeine, morphine, heroin, bromides, chloral, adrenaline, strychnine, digitalis, etc.

I cannot follow the minute description so thoroughly given by

the author in his sojourn at the Lahore Hospital and the Walker Hospital, Simla, until his return to England, nor the detailed presentation of the ravages made by the *Bacillus mallei* found at each examination but will remark that this wonderful condition has at last come to an end.

During the first attack, forty-five operations were performed and during the second thirty-seven. A total of eighty-two operations which have spotted his whole body and limbs with ugly cicatrices, and with all, left him mutilated by the amputation of his left arm, and yet the author, victim of his profession, still writes in January, 1916: "I believe that I have recovered and that, provided I remain in a healthy climate, there will be no further relapse, but this, only time can show."

A terrible prospect, is it not, for such a brave and courageous man?

REMARKS ON GLANDERS.—That this disease is and has probably prevailed among the horses of the various armies of Europe now engaged in war, is a fact that was expected. It has always been so in all wars, but probably in our day the possibility of its early detection has reduced the danger of its spreading a great deal. Malleination and principally the palpebral method, has had a great opportunity to demonstrate its undoubted, practical and scientific value and its general application must have been the occasion for many remarks and interesting observations. Such indeed has been the case with veterinary Majors Cazalbou and Meyer of the French army, who have reported some of their experiences at the *Société Centrale* and which are published in the bulletins.

The authors give first an account of an epizootic, which had broken out in a group of campaign artillery. Classical glanders, cutaneous and suspicious lymphatic lesions had been noticed in some horses and palpebral malleination was applied to 520 horses.

The positive results were: 6 cases of nasal glanders, 9 of cutaneous glanders with lesions on the legs or other parts of the body such as lymphangitis, cutaneous ulcerations, farcinous cords, ulcerated farcinous buds, etc., and 49 cases of pulmonary glanders without the slightest external symptom and all in fair condition.

These 64 positive cases were destroyed.

The test having revealed the presence of the disease in 18% of the whole number of horses and of those, in the 64 sick ones, 76%

which presented no symptom. A great proportion, which might have been raised, as knowing that in all cases of the cutaneous or nasal glanders there are always pulmonary lesions, it is possible to admit that 9 cases, classified here among the cutaneous, had pulmonary glanders as well and that if they had not been wounded, they would have remained as the 49 others unsuspected and in that case, for the clinician, the proportion of these unsuspected would have reached 90%.

From this history of the outbreak and the consideration of the results, three important observations are made by the authors which deserve attention.

1—Taking into consideration the question of the late origin of the contagion and admitting among the possible dates, the one that this origin goes back to five or six months after the exposure, the question of the morbid evolution is then, that after such exposure and with the hygienic condition of war time, a group of horses may be invaded in the proportion of 18% and that out of the sick animals, from 76 to 90% may not present any symptoms.

The conclusion is that pulmonary glanders is anterior to the nasal and that the cutaneous affection is an accidental form of the disease. A consequence, imposed from this, at least in war time, is that it is therefore necessary to resort to palpebral malleination at periodic epochs for the whole number of horses so as to detect, rather than awaiting, any cases of latent unsuspected pulmonary disease that may exist.

2—A striking analogy between glanders and tuberculosis seems also almost possible to the authors.

“From the clinical point of view, there exists, for instance, a pulmonary stage in both affections. A stage which spreads towards the anterior respiratory tract: tracheitis, laryngitis, ulcerative rhinitis for glanders, ulcerative laryngitis for tuberculosis in man.

“To the anatomo-pathological point of view, the lesions can be compared and easily arrived at the purulent or caseous softening in pulmonary tissue and lymphatic glands; while on the skin and mucous membranes, it is the chancre that appears.

“In relation to the diagnosis, it is sufficient to mention the analogy of reaction between malleination and tuberculation. In relation to the mode of contagion, it is known that infection is easily realized by the digestive tract, with either the bacillus of glanders or the agent of tuberculosis. The infection is also realized by the

respiratory tract, at least for the bacillus of tuberculosis and for that of glanders. Dourin and Naudinet have mentioned the propagation of the disease by irradiation on the subjects of a stable on the left and the right of a diseased animal.

"There exists also a certain analogy between the development of cutaneous glanders after a traumatism received by a sick horse affected with the internal form of the disease and the tuberculous ulcer of man infected with Koch's bacillus.

"What is the nature of the influence brought by the traumatism upon an invaded organism?

"From the point of view of the final nature of glanders, there exists between it and the mycosis group an evident analogy."

"Tuberculosis has been considered as a mycosis. From what is known to-day of the general characteristics of glanders, it is proper to place it as a mycosis with the sporotrichosis, epizootic lymphangitis, aspergillosis, tuberculosis."

3—The last remark presented by the writers rests upon a simple question: As long as Nocard has demonstrated that glanders can be cured, why not try to obtain this result with horses affected with pulmonary glanders *only*, which would be condemned by mallein? Would it not give an occasion for the study of this curative action of mallein upon as wide scale as possible?

ABOUT THE FORAMEN OF BOTAL.—This is the résumé of a communication made before the *Académie des Sciences* by Veterinary Major P. Chaussé.

His attention having been called to the frequency of cardiac malformations in cattle and swine, he was brought to investigate in what proportion the non-occlusion of the foramen of Botal existed in calves, adult cattle, sheep, pigs, horses, and dogs and he has found unexpected and very interesting results.

Except for the dog, the investigations were made on abattoir animals, killed for public use and without being selected. The existence of the inter-auricular communication was observed in 530 calves three months of age 161 times, in 540 cattle of all ages 87, in 522 sheep 33, in 545 pigs 103, in 273 horses 1, in 62 dogs 3 times.

From these figures the following information was drawn: In a general way, the frequency of this malformation heretofore unknown, is remarkable in calf, adult cattle and pigs. In these spe-

cies, the opening allowed the introduction of that of a probe 2 millimeters in diameter to, in general, the thumb or the index finger.

The condition is analogous in calf, adult cattle and pigs: the course of the communication is oblique in such a way that often the wall of the septum forms a small valve, and the blood returning from the left auricle into the right is prevented entirely or in part. In about one-third or one-quarter of the cases, the opening admits at least the thumb: but in proportion to the size of that of the organ, it is not large.

In cattle, the foramen of Botal is normally closed a few days or a week before birth, the figures given above relate to calves about three months old; sometimes, however, the foramen closes later: indeed at three months the proportion of those not closed is 30%, while in adult bovines the proportion drops to 16%.

In pigs, the above statistics relates to subjects from 6 to 10 months of age and the figures are somewhat near those of adult bovines. In proportion to the organ the opening is larger in swine and this may permit the mixing of blood.

In sheep, only a small number has been observed where the opening remains narrow. Similar observations have been made with dogs.

In horses, only one case was found, out of 270 subjects. The opening admitted the entrance of a large lead pencil, one centimeter in diameter. It was small and could not give rise to much circulatory disturbance.

To summarize, the presence of the open foramen of Botal is common in cattle and pigs, animals which work but little and it does not seem to interfere with their general health, but when the opening is large, it may promote a rather moderate cardiac hypertrophy. The foramen remains open exceptionally, in horses and in dogs, animals in which the heart is called to the maximum of activity. In sheep, it remains open quite rarely.

“ABOVE ALL NATIONS IS HUMANITY”—Such is the beautiful heading of a little paragraph which the worthy editor of the *Journal of the A. V. M. A.* has written in the May number.

Among his remarks he says: “*Many have lost not only a thriving practice, but even their families and homes and the only asset left them is life itself.*”

This was the true and only motive that suggested to me the organization of a league *essentially* in behalf of the Belgian veterinarians.

The paragraph then continues: "*Such cases may perhaps be found in all the countries affected, but undoubtedly some are more seriously affected than others.*"

Can any be more affected than the Belgians, because of the location of their country and the events that brought about the results?

And again: "*Although each nation or its allies in the present conflict, probably has some method or relief fund for alleviating those in acute distress*****"

Of course, but can it be expected that the Belgians in their distress and in this horrible hour of need can look for assistance from an organization of their own similar to those to which allusion is thus made? *No.*

When the hostilities are over, when peace has brought an end to the terrible struggle, and the Belgian veterinarians will be able to return home, it is then that, using the words of our editor: "*Our brother practitioners, who have lost their all, through no fault of their own*" will be in need of help and support, of financial aid to start life anew. That is the only object for which the Anglo-France-Belgian relief fund has been organized.

The French veterinarians have already subscribed over 30,000 francs, the English nearly 200 pounds sterling, Americans, a small amount, so far only 20 dollars. But America is the land of generosity and *above nations there is humanity.*

Funds can be addressed to Asselin and Houzeau, Treasurers, Place de l'Ecole de Medicine, Paris. All subscribers can remain assured that the League will do its best to bestow the gift where needed, namely to Brother Veterinarians in Belgium.

Short bibliographic acknowledgements:—The Fourth Annual Report of the Commissioner of Animal Industry, 1915, by Doctor Lester H. Howard, D.V.S.

Farmers Bulletin 713, from the Bureau of Animal Industry: Sheep Scab by Veterinary Inspector Marion Imes.

From the Research Laboratory of Parke, Davis and Co.: The action of a coal tar disinfectant on hog cholera virus, by Drs. W. E. King and R. H. Drake.

A. LIAUTARD.

MODERN REQUIREMENTS IN THE SHOEING OF HORSES—ESPECIALLY IN CITIES*

ROBERT W. ELLIS, New York, N. Y.

For many years, (as the result of the advent of the automobile) the consequent changed conditions of street surfaces has been more or less at all times, a great menace to the safety of horses, but especially after a light shower at any season and in the winter from ice. This latter condition resulting from the modern system of removing snow from the streets as soon as it falls, thereby rendering the old plan of sharpening the calks on the horses' shoes impracticable.

For a considerable time I have been longing for the development of some form of shoe that would be adaptable to the present conditions at all seasons.

You will remember, (many of you from having heard the paper read, and most of you from having read it in the *American Veterinary Review* for January, 1915) a paper presented to the Veterinary Medical Association of New York City, entitled "Horseshoeing in Many Countries", by Mr. W. J. Kent, of New York City, in which he briefly reviewed the history of horseshoeing from the time of Xenophon who tied leather soles on with straps, followed by the fibre soles, the pouring of tar on sand and walking the horses over it, thus making an artificial sole, the metal sole adopted by the Romans in Nero's time, and finally the iron shoe, fastened on the hoof with nails, as first adopted by the Celts.

All of these methods of shoeing, it will be seen, have had for their object the protection of the hoof from breaking or too rapid wearing. As a matter of fact, that continued to be the object of shoeing, with the exception of the sharpening of the calks for ice, down to our own day and generation. Advance was made in the details of shoeing, as in the better mechanical preparation of the shoes and of the feet, but the principles remained the same.

During the life-time of the present generation, it became evident that the harder, smoother road surfaces called for something else besides protection from breaking and too rapid wear; it required some form of shoe to relieve concussion and give the horse's

*Presented at the meeting of the New York State Veterinary Medical Society, Ithaca, N. Y., August 3, 1916.

foot a hold on the street surface that a steel shoe did not give; and the many forms of pads were developed, first made from some sort of composition and later of rubber. All these pads required at least a three-quarter steel plate to retain them in position and protect the wall of the foot.

Then a channel shoe with rubber filling was put on the market, I do not know in what year, but my first recollection of it dates back probably to seventeen or eighteen years, possibly twenty. They appealed to me, and I put them on my driving horse in the winter and drove him over the snow-covered street, (that was before they used to remove the snow and leave us an ice-covered surface in its place) with impunity. I remember well an old horseman who used to drive a four-in-hand of four Wilkes stallions to a two-wheeled cart, stopping me to see what I had on my horse, that enabled him to go so fearlessly, as he could see that he was shod plain.

That shoe was not suited for plain, wet, or ice-covered asphalt surfaces, as the rubber contact was not sufficient, and it would not stand the wear and tear. The same applies to the rope-filled channel shoe.

So for many years, as the street conditions have continued to grow worse for the horse, being constructed more and more along lines favorable to the automobile and unfavorable to the horse, the demand for a shoe that would adapt the horse to the streets, has constantly increased, and was met only when the principle of shoeing the automobile, (for which the streets had been constructed) was imitated.

You all know what a hazardous thing it would be for a man to drive over asphalt streets in an automobile with steel tires, and you all just as fully appreciate your position in driving a horse with steel shoes, or even with the best kind of pads and steel tips, over an oily, smoothly-worn asphalt street after a five minutes shower, because many of you have experienced it. The only thing to do is to imitate the shoeing of the automobile with an all-rubber contact of as broad a surface as possible, in order to protect the horse from strains or more fatal injuries and your client from financial loss due to the same.

The public too, has become deeply interested in this problem from a humane stand-point, and in New York City this past spring, the Board of Aldermen attempted to pass an ordinance compelling

horse-owners to shoe their horses and mules, between the months of November and April, in such a manner as to prevent slipping; but were unable to pass it, as the owners did not feel that the humane societies who were behind the project, were capable of determining just what constituted such shoeing; and the veterinarians felt the same way about it, and so opposed the measure. This opposition by the veterinarians, was not fully understood, (probably due to the manner in which they went about it) and the societies formed the impression that the veterinarians were arbitrarily opposed to humane measures. I did not attend any of the aldermanic hearings, but a few days before the last hearing was to be held, a committee waited upon me at my office, and requested me to give an expression of my views that they might use them at the final hearing. I told them that I believed that horses should be shod, not only between the months of November and April, but at all times so as to prevent slipping, but I did not think it a fair proposition to give any one on the street the power to arrest a man because the man on the street, (or the woman, still worse), thought the horse was not properly shod.

"I would not like to relinquish the right to be the judge as to how my horse should be shod," I said, "as the man on the street may not know as well as I do, how to shoe my horse for my work, and my clients would feel exactly the same about it."

They then remarked that my horse was always out in all weathers and street conditions, and asked me how I managed it. "How do you shoe him"? one of them asked. "The same as my friends who use automobiles shoe them", I replied. Then at their request. I showed them the shoes I was using. They became interested and wanted to know how such shoes were procured. I told them that they were in the open market, and any horse-shoer could get them, the same as he got his nails and other necessities. They asked me if all veterinarians knew about them and I said: "Why certainly, as I have explained to you, they are on the market". Then they asked me if I would not discuss them with my colleagues at some time, and I finally yielded by promising that at some time I would have something to say regarding the requirements of modern conditions in relation to horse shoeing, hence this paper, which I am sure is going to get me in hot water, particularly because it is not possible to prepare a rubber shoe at the forge specifically for the foot that you are going to shoe, and some of my

friends will remind me of the old caution against fitting the foot to the shoe instead of the shoe to the foot. I welcome the chance of an argument along that line, however, as it will give me an opportunity to endeavor to eliminate from the minds of my colleagues, some of the prejudices that the actual use of a rubber shoe for nearly three years, has eliminated from mine. So as my desire is to make this paper as brief as possible, I will endeavor to go straight at the subject.

We all know that an unshod hoof will take a firm hold on a yielding surface, such as turf or dirt road, and that that same hoof, when protected by the addition of a steel shoe, will take an equally firm hold under the same conditions; but will not take hold on an unyielding surface, and is a positive menace to the horse's safety on a smooth, polished, unyielding surface, such as our present city streets. So that, as the street surface is unyielding and smooth, we must, while protecting the hoof from breaking or too rapid wear, make it yielding and clinging on its own surface; and rubber is the one material we know of today, that will fill that role, and at the same time, possesses the requisite wearing quality. We must shoe with rubber. The demand for such a shoe has been met, and there is now to be had, a shoe that not only fills that demand, but by its construction, tends to broaden an abnormally narrow, or contracted foot. One of the fundamental principles and the most important step in the shoeing of a horse's foot, is to have that foot absolutely level, so that every segment of the limb from the pedal bone up, will meet its fellow with a level articular surface. The second step is to apply to that foot a shoe whose surface, both in relation to the foot and to the ground, is absolutely level—no matter whether it is a steel shoe or a partly rubber shoe. That is one of the principles of horse shoeing from which we must make no departure. With your permission, to illustrate its importance, I will cite a case from my practice.

A horse was brought to me with the history of being slightly lame. I rode behind him and found him to be unmistakably lame in one fore foot and took him to the forge to remove the shoe to examine the foot. When the smithy had removed the shoe, I took the foot in my hand to examine it, and noticed it was not level. I looked it over more carefully and found the foot a half inch higher on the outside than on the inside. I asked the shoer to lend me his apron as I wanted to try an experiment, (I did not want to hurt

his feelings as he had shod the horse), and I took a rasp and leveled that foot, had the same shoe put back (it being level), told the owner to put on a wet bandage from the coronet to above the pastern and keep it wet. I called to see the horse the next day and he was going sound. It was one of those feet that I shall refer to, as growing on one side only, the outside in this case, having its normal obliquity, while the inside wall was vertical. I saw to it that that foot was kept level after that, and the horse continued to go sound.

When it comes to the width, length and conformation of the foot, we can approximate a normal foot so nearly in a ready-made shoe, that even the limitations of cold fitting will permit all the changes in it that are required; and even in the case of an abnormal foot, or one of bad conformation, after adhering to the principles of a level shoe and a level foot, it has been my observation, that it is often a good thing to fit the foot to the shoe. We are dealing with an abnormal foot, we will say. Probably it grows only on one side, so spreads on that side and not on the other. In a foot of that character, if the unilateral contraction is but slight, I would fit the shoe so as to give as much fullness at the quarters and heel as it has on the normal side, allowing the shoe to extend beyond the foot wall. If the unilateral contraction is excessive, of course I do not fit the shoe quite as full as in the normal foot, but still leave it pretty full. The rubber shoe that I have had experience with for the past three years, will permit of opening or closing as required. Its surface is absolutely level and can readily be fitted to any level foot. I am not speaking theoretically, but from the stand-point of one who has shod horses. I never did it for a living, but I learned the art of shoeing when a youth. This shoe is so constructed that it not only prevents slipping, but also reduces concussion to a minimum and expands the foot, because the rubber does not only come in contact with the ground surface, but also with the wall of the foot and a portion of the sole. That is, contact to all intents and purposes, being divided only from those parts by a layer of cotton duck. This contact with the sole for an inch or more inside the wall, causes a gradual, healthy expansion of the foot.

In the case of my own horse, a pair of No. 3 fitted him the first time he was shod with this style of shoe, and the next time, it required a $3\frac{1}{2}$ to give him the proper support; and so you see that I virtually fit the foot to the shoe. The inside of his foot approached the vertical more than the oblique direction, because the

inside of his foot did not grow as fast as the outside. It was therefore without the same degree of contact a good part of the time, because the outside of the foot would grow and lift the inside up from the bearing surface. But by shoeing him full on the inside I gave him a wider base and better bearing on the ground surface, which, together with the pressure upward and outward on the sole and wall, effected by the form of the shoe, tended to gradually but effectually spread the foot, so that at the next shoeing he required the larger shoe, which he has continued to wear. Hence fitting the foot to the shoe proved to be not only practical but highly beneficial. The horse in question, on account of the contraction, was going a little sore and placing his feet down with great care, which gave him a mincing, limited stride; so you can appreciate my gratification, more, enthusiasm, when the horse not only soon traveled with freedom and confidence, but began to display a little action, a qualification that evidently belonged to him, but had not been possible to exhibit on account of the tenderness and consequent lack of confidence. Furthermore, the horse was wearing three interfering boots up to the time he was given the wider firmer base of support by this shoeing, and has never required them since.

I could cite a great many similar cases in my practice, but do not think it is necessary to bring out my object, which is, to get my colleagues to *interest themselves in the shoeing of their clients' horses to meet the modern street conditions*, not only from the commercial side, which interests our clients, (as despite the usefulness of the automobile the horse is a great necessity in our cities and in greater New York approximately 110,000 are still in use) but also from the humane side, in which we are intensely interested; just as much interested as any of the societies that devote all their time and energy to that one end,—more earnestly interested than some of them.

You and I feel that it would not be just to pass an ordinance that would place the matter of proper shoeing in the hands of any one that comes along, but we also know, that a very great many horse-owners make no attempt to shoe their horses to meet street conditions. Never is that more clearly demonstrated than after a snow fall, when all teams are engaged that can be procured, and we have the painful sight of horses slipping, sliding and skating all-over the streets with plain steel shoes on. The humane societies go after them and they appeal to us, and we naturally try

to protect them, but feel in our hearts and souls that they ought to do something to protect their horses against the straining that such slipping causes. This society has adopted as its slogan, "the Humane Treatment of Animals" and we as its members must be consistent if we would command the respect of the good people that give their lives and their fortunes to the protection of the animals that afford not only their owners, but ourselves, a means of support. So I come to you, not to indorse this shoe because I have found it to be the best yet produced for the purpose, as I am not in the least interested in the shoe or any one connected with it as you of course know. (To be fair to the producers of it, I should add that they have not the slightest idea that I am reading this paper, or exhibiting their shoe.) But I wish we could think more about this problem of shoeing horses to meet modern conditions. If we put all sentiment and all humane feelings aside it should interest us, because it is the street conditions more than everything else together, that is taking our horse clients from us. They will tell you so themselves, and I know it is a fact. Many men who want to use them in business have ceased doing so, not because the horse's work can be done any better or cheaper, on the contrary, but because of the street conditions. Let us try to meet them as much as possible by shoeing. It is the only way that we can do it.

PROBLEMS IN MILK PRODUCTION*

H. E. COOK, Canton, N. Y.

I early became mixed up in the milk business. All my life in one way or another I have been interested in milk, in manufacturing butter or cheese or other products of milk in some form. Considered as a whole, the milk business is one of the most complicated and difficult of solution of any industrial question before this country today.

Milk is our most perishable food product. That makes its handling very complicated at the start. So many people are engaged in its traffic; that adds to its complication. Then the nature of the business; its origin and development add not a little to the difficulty of solving the problems.

*Delivered before the New York City Veterinary Association, May 3, 1916.

It has partly, at least, come about in this manner: farmers had to have plant food. They wanted fertilizers and so they kept cows. As a result cows have been kept, raised and milked in such vast numbers that milk became a by-product and manure the essential product. A fundamental factor in the law of economies is that the value of a by-product has no relationship to the cost of raw material from which it is made. Hence, we found ourselves producing milk at less than the actual cost of labor, feeds and other overhead charges incident to the business. The only way found to save the farms in New York was to introduce dairy cows. Cows were rushed on to farms all through the east and to the middle west, not to make profit, but to make fertilizers until we had so much milk we did not know what to do with it. We know now how to grow crops without cows, but we have learned these things only in recent years. The producers, however, did not handle and sell the milk; they turned that over to other people. That gave rise to new problems.

Then came laws to control the quality of milk. These laws have been conducive of wholesomeness and purity but not in advancing the price, yet price advances have taken place in respect to all other products. People accept these advances without a word. If, however, a small advance is suggested in the price of milk, the air at once is disturbed with protests. The city papers cry out to the effect that the milk trust has shown its teeth, encircling out in every direction those words spread.

The fact is, not one quart of milk in ten quarts that goes into New York City has charged against it the total cost of production. If all legitimate charges were made and paid, producers would go bankrupt. The milk that goes to the city trade is the work of the family, —father works, mother works, the children work. Suppose the milk checks are paid. Is the wife or the children paid for the labor they put into the production of milk? The fact is, these workers are unpaid and every day their labor is put into milk production without full compensation for what they do, but people won't do this always. Uprisings are occurring in the country. Wives and children some of these days are going to strike. It will not be a question of higher wages but of payment of wages for labor actually expended at nominal prices for it.

I believe dealers are working on small margins in handling milk. This is not the rural belief or sentiment, but, nevertheless, all things considered, the profit that the dealer makes on each quart

of milk is small. What is, therefore, the logical conclusion? Just this: consumers must pay more for milk or they must be content with cheaper methods in its production. It won't be the latter, hence milk must go up in price.

Farmers are entitled to a labor compensation and a fair return on their investments. Cheaper methods of distribution are possible, but cheaper methods of production are not possible. The average good dairyman can not possibly lessen the cost price of his milk. Producers are entitled to as much profit and consideration as either the carrier or the distributor.

I am interested to know if transportation can be lessened. Apparently the railroads are getting more than their fair share, providing they were paid enough at the outset. The transportation is now efficiently organized, long trains are handled, it is an every day certainty and does not have to be exploited.

Producing milk is a business and to produce clean milk costs more money; yet the fact remains that but little more is paid for clean milk. Moreover, the men who produce clean milk are from the very nature of the business, a class of producers whose standards of living are high. They refuse to be classified with incompetent producers or submit to a low scale of living. A low scale of living means a poor grade of milk. Milk made under dirty conditions is not fit to use.

Dairymen are making themselves better in order to produce better milk. In doing this they have got to get more for their milk because it costs more to produce it, and because the people who produce it cannot live under the conditions where dirty milk is produced. An important step in better milk is better cows. Dr. Moore, whom we all know and all respect, has worked out a plan whereby we can register healthy herds. The registry of healthy cows does not mean that they are all to be full-blooded. You can not take a few cows, put them together and make a healthy herd. It takes time to develop healthy cows, with strong udder tissue, good digestion and free from communicable diseases.

We have been accustomed in the past to consider milk cheap and more or less a contaminated food. A new era is spreading before us and some of us now understand that milk must be kept from contamination after it is drawn from the cow. Permit me to prophesy that the pathological and physical condition of the milking cow will be as prominent and as important in the judging of milk

quality before another decade has passed, as the bacteria count is now.

My own opinion is that our present standard of measure is not ideal and only half correct. The problems are to free cows from tuberculosis which we fairly well understand, and to clear away abortion and kindred troubles, which we soon will understand and control. I am speaking now of certified not of the cheaper grades of milk. What is wanted is to maintain a normal, physical condition of the cow from day to day by a sane system of feeding and care. This means high grade intelligence at every point. It means more costly milk, and must put it into a class by itself.

We have fought oleo with butter made from filthy stables and we all know the result. A similar verdict awaits the milk business unless laboratory hygiene and sanitation coupled with physiological strength, vigor and purity get into the stable, factory and the dairy cow. We have discovered to our sorrow that sunlight and country air do not destroy pathological bacteria around a farm home as fast as negligence and ignorance develop them. We have learned that a rural birthplace and the little red schoolhouse are no longer a charter of wisdom or a certificate of broad-shouldered strength. We have discovered that a man does not have to be born in the country to be a farmer any more than a veterinarian must be born in a clinic.

The pure grades of raw milk generally known as certified are better and safer than pasteurized milk and consumers know it, but, of course, as producers we must not lose sight of the essentials in its production.

In regard to pasteurized milk, I believe that the average market milk is better when heated. We have had many sad experiences with tuberculosis, due to feeding skim milk to dairy herds. Yet very many people who would be protected by such legislation oppose the change. The difference between good milk and market milk is the difference in men. You cannot make high grade or certified milk with every type that comes along. We have passed the time in the certified field when the barn is to be the dominant factor. We want a certified cow. To get a certified cow means room to let the young cow loose. She should be allowed to run loose from calfhood until she takes her place in the dairy herd. The feed should be uniform throughout the year.

Still another problem. It is to have consumers appreciate the food value of milk, to let them know what an extensive process is involved in milk production and to appreciate the full food value of milk. This can be done by advertising; but advertising can only be done by dealers. The producers are too numerous to be organized. Cheaper methods of distribution will in time be worked out. Then the control of the milk and cream supply will be done by a single corporation or it will be done through municipal ownership. One or the other is coming. Either would cheapen present methods of distribution.

As now organized, the government offers no safe chance for business enterprises. We have no policy anywhere; in the small town, in the city or in the state. Where there is a three-headed commission we say there ought to be one, and where there is a one-headed commission there ought to be three. Ours is a state without a policy. The government ought to run its business this way. Unfortunately, when we get a new administration, everybody is expected to drop his work and a new set of men take it up. Occasionally men continue through different administrations. That is a little better, but still bad, because of uncertainty. "To the victor belongs the spoils" has not been eliminated from the minds of men.

Until this is eliminated, handling big business problems such as the milk traffic cannot be as economically administered by government as by individual or corporate interests.

There has been developed, however, a workable system of government supervision of big business that does have the endorsement of the people. It is just as logical and workable to have a single combination in New York City to handle milk as to handle telephone messages. Two telephone companies tried to do business in New York State, but when they combined better service resulted than when we had two systems. Efficiency goes up as competition goes down. Competition is ruinous and is not the life of business. Cooperation today is the life of trade.

If we could save a half cent through combining all of the milk concerns, it would mean much, but that saving should go wholly to the producer. What a tremendous advance a half cent a quart would mean in milk production! More than efficiency is wanted. You cannot get a big harvest done with a short cutting bar, no matter how sharp the knives or well geared the machines. The whole milk business is not, but should be, properly organized and properly

linked together. Prices have got to advance; consumers must be made to understand that they are getting their full money's worth in paying more for a better product. Railroads, dealers and producers, all parties concerned must work to give each full justice.

I believe thoroughly in organization to obtain a larger profit for the milk producer. It must come, however, from a full knowledge of all the factors involved: production, transportation, distribution; any other plan will produce anarchy and warfare which multiplies expenses and which in the final balancing of accounts the producer must pay.

THE OCCURRENCE OF THE GIANT NEMATODE, *DIOCTOTHYME RENALE* (*EUSTRONGYLUS*) IN THE UNITED STATES AND CANADA

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The giant nematode, *Diectothyme renale*, or, as it is more commonly known, *Eustrongylus gigas*, or *Eustrongylus visceralis*, is one of the most striking of parasitic worms and one which is not likely to be overlooked in autopsies. Recently the writer had brought to his attention 3 cases of its occurrence in dogs in New York State and this led him to search through the literature for other records for the United States. These proved surprisingly few, and in an attempt to get together data which might possibly be of aid in a study of its life history, letters of inquiry were sent to leading workers in parasitology and in comparative anatomy in every state and in Canada. Of these the great majority replied that they had never personally noted the worm, though several stated that they had for years watched for it in the course of their studies.

For these reasons it seemed worth while to bring together the data collected, as well as to place on record the cases above mentioned. I shall first deal with the unpublished cases and then bring together such records as I have found noted in the literature. This summary makes no pretense of being complete but may lead to the placing on record of additional information regarding this interesting species.

I am under obligations to all who have so kindly responded to my inquiries as well as to those who furnished positive data, men-

tioned below. Especial thanks are due to Drs. Ransom, Hassall, and Hall, who put at my disposal the records of the Bureau of Animal Industry of the U. S. Department of Agriculture.

UNPUBLISHED CASES. I. A pointer dog which was being fumigated with nitrobenzene for external parasites, in the Department of Entomology of Cornell University, died during the process. As many other animals had been subjected to this treatment without untoward effect, by Professor William Moore and his colleagues at the University of Minnesota, and by Mr. W. L. Chandler and myself at Cornell, we promptly held an autopsy to determine the cause of death. On opening the abdominal cavity two large female specimens of *Dioctothyme renale*, measuring some twenty-two inches in length, were found overlying the left lobe of the liver, closely crowded between it and the diaphragm. The general pathological conditions, to be reported upon more fully by Mr. Chandler and the writer in a forthcoming paper, were such as to leave no room for doubt that the predisposing cause of death of the animal was the presence of the parasites in this unusual position.

The dog was born and reared in Georgetown, S. C., and had been in the north but a few days. It is to be noted that it was a male, a point of special significance in view of the suggestion of Sonsino 1897, that *Dioctothyme renale* may enter its host through the genito-urinal aperture and that occasionally in female animals it may gain entrance to the peritoneal cavity by passing into the uterus and finally through the funnel of the fallopian tube. There was no sign of injury of either of the kidneys, and there was no evidence of earlier lesion which would indicate the escape of the worm from those organs.

II. A male specimen of *Dioctothyme renale* is preserved in the collection of the New York State Veterinary College at Cornell University. There are no further data regarding it, but it is very probable that the specimen was collected at Ithaca, in the course of the work of the Veterinary College.

III. One specimen, a female, was found by Dr. Israel Kleiner, in the peritoneal cavity of a mongrel at the laboratories of the Rockefeller Institute, New York City, December 15, 1914. I have not available information as to the sex of the dog. Since it was suffering from experimentally induced peritonitis there were no pathological conditions noted as due to the presence of the worm. For bringing this case to my attention, I am indebted to Dr. F. S. Jones, who determined the specimen.

IV. This interesting case is reported by Dr. O. V. Brumley, of the Ohio State University. The host was a female dog, weighing perhaps sixty pounds, and apparently in fine physical condition, which was being used for operative surgery. "On making an incision through the abdominal walls one of the parasites was found at the point of incision. Upon investigation we found that there were several of these parasites present in the abdominal cavity. After we had disposed of the animal, an investigation of the kidneys was made. One kidney was apparently normal, the other one about four times larger than normal, and upon opening it we found it to be filled with the females of this same species. The kidney substance itself was entirely destroyed, nothing but the capsule left, and it was very much thickened. *****The remarkable thing so far as I could see was that the animal during life showed absolutely no symptoms of any infestation. It was quite evident that the kidney not effected was taking care of the excretions made without any difficulty". Dr. A. G. G. Richardson, referring to the same case, states that two of the worms were found in the kidney, and four in the abdominal cavity.

V-VII. Dr. Arno B. Luckhardt, of the Department of Physiology, of Chicago University, reports the following three specific cases. In each the host was a female.

"I first met the worm about 1910 or 1909, during a laparotomy in what appeared to be a perfectly healthy dog. On opening the peritoneal cavity I noticed the worm, but supposed it to be a highly hemorrhagic loop of bowel which was swaying gently from side to side. On taking hold of it, and finding it free from mesenterial attachments, I found I was dealing with a giant worm. It was the largest specimen I have ever seen, measuring about one meter in length. It was the only specimen present, both kidneys being free from the worms."

"Early in June, 1914, Dr. Keeton brought a dog to the laboratory from Albany, New York. It was a well-fed fox terrier. Soon after its arrival it began to vomit. At first the vomiting was attributed to the double vagotomy (above the diaphragm) performed shortly before its arrival in Chicago. The dog vomited incessantly. As a result it rapidly lost weight. All procedures instituted to check the vomiting having failed, Dr. Keeton etherized the dog and at necropsy found that vomiting no doubt arose reflexly from the stimulation of the peritoneum by the irritation of six or seven of

the worms under discussion. These worms were free in the peritoneal cavity."

"Last summer (1915) I disconnected the Pawlow pouch from a brindle pug that I had used for some research work during the previous year. On entering the peritoneal cavity the first structure which came to view was a kidney worm. The peritoneal cavity was thoroughly explored but no other worms were found. I still have the dog".

VIII and IX. Reported by Dr. T. W. Hastings, of the Cornell Medical School, New York City. "Two cases, only, are recalled. One dog had hematuria and in both cases a post-mortem showed the worms in the pelvis of the kidney. Details of the cases were not recorded."

X. Professor E. M. Walker, of the University of Toronto writes "A pair of these worms, male and female, were sent to me last spring (1915) from the Provincial Board of Health, Toronto. They had been taken from the abdominal cavity of a small dog in Toronto. The female measures about 60 cm. and the male 41 cm."

XI. Professor Walker also states "In our museum there is a specimen of the kidney of a mink, containing a coiled-up worm which I have always believed to be this species. It occupies a greatly dilated pelvis of the kidney, the glandular part being very thin and atrophied. This specimen, I believe, was taken at Go Home Bay, Georgian Bay, Ont., but I am not certain."

XII. Dr. J. Percy Moore informs me that there is in the collection of the Academy of Natural Sciences of Philadelphia, a large female specimen from the kidney of a coyote. "No locality is given but as Dr. Horn spent much time in western collecting trips it was probably secured on one of these."

This record is accompanied by data relative to the two specimens in the Leidy collection, reported below.

XII-XVII. There are preserved in the collection of the Bureau of Animal Industry, at Washington, D. C., specimens from six cases of infestation of dogs by *Diocotylome renale*. One of these cases has always been reported by Sommer, 1896. Dr. M. C. Hall has kindly given me the following data regarding the others:

XIII. From visceral cavity of a dog, Washington, D. C., 1909. Collected by Dr. Robert Formad; determined by Dr. Hassall.

XIV. At least five worms, of which two were preserved, from the abdominal cavity of a dog shot as a rabies suspect. Negri bodies demonstrated. Collected by Dr. Formad, July 19, 1908.

XV. One specimen from the abdominal cavity, in contact with the liver, of a dog. Collected by Benj. McInnes, at Charleston, S. C., Sept. 17, 1908. Determined by Drs. Hall and Hassall.

XVI and XVII. No data.

XVIII. One case of the parasite in a dog, observed by Dr. Guthrie, of the Department of Physiology, of the University of Pittsburgh Medical School "a number of years ago". Reported to me by Dr. R. E. Sheldon, of that institution.

XIX. Dr. F. Robert Zeit, of the Northwestern University Medical School, Chicago, Ill., reports having found the worms repeatedly between 1910 and 1915, in stray mongrel dogs, caught by the city dog catcher on the streets of Chicago. A number of specimens of the worms and of infested kidneys are preserved in the collections of the Pathologic Museum of the Northwestern University Medical School.

In addition to the above reported cases, Dr. Luckhardt, of the University of Chicago writes "Between 1909 and 1914, I met the worm several times free in the peritoneal cavity,—never in the kidneys."

AMERICAN CASES ON RECORD. As stated before, the published references to the occurrence of *Dioctothyme renale* in North America are few. The following have been noted by the writer:

I. Breder, 1882, in a communication to the Journal of Comparative Medicine, reports finding twenty-one round worms, "of the lumbricoid variety", varying in length from nine to twelve centimeters, in the abdominal cavity of a horse, after several days of suffering. "The kidneys were full of small, round holes about one centimeter in diameter. These holes were very numerous, giving the kidneys a worm-eaten appearance. The change was supposed to be due to the passage of the round worms through the gland tissue for two reasons. First, the holes passed through the capsule, as well as the kidney tissue, and a second worm was found in one of the kidneys". "Transverse sections of the openings gave them the appearance of pretty clean-cut holes at the expense of the kidney structure. Each canal was surrounded by a thin layer of inflammatory exudation, but the inflammatory action was limited to a very thin area, and evidently had not irritated the gland tissue to any marked degree."

In commenting on this communication the editor (W. A. Conklin or W. H. Porter) says "Undoubtedly this case is that properly entitled *Strongylus gigas*".

II and III. Leidy, 1856b, states regarding this parasite: "Frequent in the kidneys of the mink, *Putorius vison*, and occasionally occurring in the dog, *Canis familiaris*".

Stiles and Hassall list specimens from both sources in the Leidy collection. Dr. J. P. Moore writes "The Leidy collection at the University of Pennsylvania, under the name of *Eustrongylus gigas* includes two lots of the worm in question. One of them is a large female, altogether lacking data. The other is labeled 'from *Putorius vison*'. It is Leidy's No. 89, Stiles No. 4954, but no locality is given, the probability being that it came from the vicinity of Philadelphia. There are several of small and medium size".

IV. Sommer, 1896 reports finding two specimens in a kidney of one of fifty dogs examined for animal parasites at Washington, D. C. These specimens are preserved in the collection of the Bureau of Animal Industry.

V. Stratton, 1843, found four specimens, varying in length from six to eight and a half inches, in the peritoneal cavity of a bitch, at Kingston, Ont. He apparently was the first to suggest that in such cases "there is some possibility that they passed from the uterus, along the Fallopian tubes".

VI. Torrance, 1900, found an eighteen inch specimen in the right kidney of an Indian dog at Winnipeg, Canada. The parasites had caused the death of the animal. Torrance adds "Indian dogs in the vicinity of the big lakes are usually fed on fish which are thrown to them whole and uncooked."

VII. Leidy, 1856b, is also authority for the statement that a Mr. Joseph Jones, "of Georgia", found an eight inch specimen of this same species associated with *Filaria immitis*, in the heart of a dog. Some European writers cite Railliet as having reported such a case but he merely says "On en a vu aussi dans le foi, dans la cavité thoracique, dans le coeur (?), etc." Evidently he had the Leidy report in mind.

While this case is very generally discredited by parasitologists, I can see no good basis for repudiating it. Magnie, 1870, reports finding the worm in the pleural cavity of a dog.

VIII+. In addition to the above records, Stiles, 1898, incidentally states concerning *Diocotthyme renale*: "Welch and others have found it in Baltimore; several specimens are contained in the Leidy collection of parasites belonging to the University of Pennsylvania, and various members of this Bureau have found the parasite

in dogs in Washington, D. C." Most of these cases are referred to elsewhere in this paper.

REPORTED HUMAN CASES IN THE UNITED STATES. It is well known that *Diocotylhyme renale* may occur rarely, as a parasite of man, and a number of cases are on record. The following supposed instances are reported for the United States:

I. Engert, 1898. The case of a patient residing in St. Louis, Mo., who complained of sudden darting pains in the region of the kidneys. This was followed by diarrhea and by hemorrhage from the bladder. Later the patient moved to a region where the drinking water was strongly impregnated with sulphur. He experienced difficulty in urinating and passed a worm about 5-6 inches in length, and in a few days 5 or 6 more of varying length.

II. George, 1888. Patient was a man seventy-three years of age who had been gradually failing in health for a year, and who suffered from vague pains in the back. Following a severe attack of renal colic, "in a few days, he passed from the bladder a half dozen worms". The supposed worm seen by Dr. George "was about three inches in length, two lines in diameter, bearing some resemblance to the common earth-worm. He said the others were both longer and thicker". The patient died and Dr. George states that on autopsy "we found the right kidney enlarged, weighing two and a half pounds, not a particle of healthy or normal tissue about it. In external appearance it resembled a fatty kidney. We found no worms either in the kidney, ureter or bladder but, on section, we found unmistakable evidence of their habitation. About one-fourth the entire mass, including the pelvis and infundibula, presented the appearance of being eaten by worms; looked like a mass of dry curds."

III. Martin, 1891. A man sixty-six years of age, suffered intensely from pains centering in the region of the bladder, "every few minutes rising to void his urine, or trying to but failing, only a few drops would pass, which had the appearance of clotted blood, —or would coagulate in a little time into a firm clot". The patient was a traveling veterinary surgeon, or castrator, whose work subjected him to very great muscular strain, day after day. On the eighth day after treatment began, he passed two "worms", seven and fifteen inches in length through a No. 9 catheter. "These worms, or entozoa, were of a dark-red or brown color and about the

size of a small rye straw or a large knitting needle, somewhat resembling the *ascaris lumbricoides* found in the intestines''.

IV. Morehouse, 1898. Patient, in Ohio, had severe renal colic and seventeen days later passed a worm nearly a foot in length, followed in two or three days by a four inch and a seven inch specimen and, up to the time of the report, by fifty-five, varying in length from one inch to one foot. Concerning this case see the illuminating report by the family physician of the patient, Lewis, 1898.

The great majority of the supposed cases of infestation of man by *Diocotthyme renale* have been shown to be based on error. In this class must be placed the above four alleged cases. Those of George, and of Martin have been investigated by Sommer, 1897, and that of Morehouse has been explained by Lewis, 1898. The four cases are typical instances of pseudoparasitism, blood clots, fragmentary blood coagula, and casts having been mistaken for worms.

SUMMARY AND COMMENTS. There are herein reported twenty-seven definite cases of the occurrence of the giant nematode, *Diocotthyme renale* in the United States and Canada. Of these, nineteen are published for the first time, while eight were already on record.

A surprising number of the cases, twelve out of twenty-seven, or 44%, relate to the occurrence of the worms in the peritoneal cavity. This is probably due to the fact that most of the twelve were observed by physiologists, in the course of their experiments. In one instance the parasite is said to have been in contact with the liver, while in another, Case I, two of the worms lay over the left lobe of the liver, between it and the diaphragm.

Stratton's suggestion, made independently by Sorsino many years later, that the parasites may pass from the uterus along the Fallopian tubes, and thus finally come to lie in the abdominal cavity is not borne out by the above data. Case I relates to their occurrence in the abdominal cavity of a male host.

The four cases of supposed occurrence of *Diocotthyme renale* as a parasite of man in the United States cannot be accepted. In this connection it may be said that Dr. F. R. Zeit states that in three thousand autopsies he has never met with the parasite in man.

Available data furnish no safe basis for determining the percentage of infestation of dogs in this country. Sommers found one case in fifty examinations. The writer has found one out of ap-

proximately a hundred dogs. On the other hand Dr. Barker reports that it has not been met with in two hundred and five examinations.

While the present report adds considerably to the known cases of the occurrence of *Diocathyme renale* in the United States and Canada, it must be pointed out that this is the result of co-operation on the part of workers in every state as well as in Canada. As compared with Italy, where most of the cases in the literature have been found, the territory covered is enormous, and most of the reports have been negative. The parasite cannot be regarded as common in this country.

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AN APPEAL TO THE VETERINARIANS TO HELP IN THE FIGHT AGAINST TUBERCULOSIS*

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When I was invited by Doctor Mc Donough to address this meeting, and was told that I might talk upon any subject that I preferred, I felt greatly honored. Just at that time I was doing some work on the new treatment of tuberculosis in men, and was deeply interested in it. Recently it has occurred to me that there are certain very important agreements in the action of tuberculosis in men and animals, and while there is danger that I may tell you things that you are already more familiar with than I am, I trust that you will bear with me in view of the intense interest which surrounds the subject, and its incalculable importance so far as it touches human life, and the well being of the entire animal kingdom.

So far as I know, there is not very much to report that is new in the fight against the great white plague in animals and what is so deeply interesting us in the handling of human tuberculosis is in reality, a modification of Koch's method of using tuberculin. Whether this method can be profitably and effectively used in treating cattle, only time and careful experiment can determine.

As you are probably aware, the treatment of tuberculosis with tuberculin was advocated by Professor Koch about 1890, and was taken up by the medical profession with the utmost avidity. Unfortunately Professor Koch and his assistants were, comparatively speaking, setting sail on an uncharted sea, and were guiding their course largely by conjecture and by results obtained in treating other diseases. They had discovered a remedial agent of unknown power and unmeasured possibilities. They seemed to assume that two or three doses of the new agent ought to cure a case of tuberculosis, and tuberculosis they looked upon as an infection to be forestalled by a vaccination, like smallpox, or rendered harmless by antitoxin, like diphtheria. As both of these conceptions were erroneous, it is not surprising that these experimenters were disappointed in the results of their treatment.

*An address before the New Jersey State Veterinary Association, July 13th, 1916.

Professor Virchow, the most celebrated pathologist of the world, at that time, led a crusade against Koch's new remedy, and tried to establish the claim that the pitiful condition of the advanced consumptive was at least rendered worse by tuberculin, if it was not caused by it. He asserted that this agent "mobilized" the tubercle bacilli already in the consumptive's body, and dispersed them through the system to extend their work of destruction. Inasmuch as even minute doses of tuberculin do activate to some extent, the bacilli already present in the patient's body, and large doses may cause local, focal and constitutional reactions, there is a certain amount of truth in Professor Virchow's statement regarding the mobilization of the bacilli; but that they are drawn into the blood stream and passed all over the body in it, is not true.

At any rate the tuberculin treatment of tuberculosis in human beings, got a decided "black eye", from which it has not yet entirely recovered. Veterinarians know that tuberculin is not a poison and that it has no effect on healthy animals. Physicians seem to still cherish the delusion that it is a poison, and that it may seriously injure a healthy person even if it does not set up the very disease it is intended to cure.

The long and successful use of tuberculin, in testing cattle, has taught the veterinarians a most valuable truth, and these innumerable tests like the routine examinations of the urine in life insurance examinations, have had an extremely important bearing upon both the pathology and treatment of men and animals. As it is stated in the Report of The International Commission, of the American Veterinary Medical Association, in 1911: "That the Commission recognizes after careful study, that the tuberculin test is the fundamental factor in any policy having for its object, the control of bovine tuberculosis." (Circular 175, Bureau of Animal Industry, March 17, 1911.) This Commission consisted of such men as, Professor Ravenel, Doctors Hurty, Moore, Schroeder, etc.

As science advances, and as the search after truth by actual experiment supersedes the old so-called philosophical conception of medicine, by which it was in vain attempted to make the facts conform to a preconceived theory, the collateral branches of medical practice naturally are assuming closer relations with the great body of the profession and are themselves doing much experimental work.

In this particular instance, it would seem wise for the veterinarians to at least attempt the treatment of tuberculous cattle on a large scale with tuberculin. Unfortunately, with the limited time at my disposal, I have not been able to make a résumé of the literature sufficiently extended to show whether this plan of treatment has ever been carried out on a scale large enough to prove or disprove its value. There is no question that many cases of bovine tuberculosis recover and that many more would recover in animals, as well as in men, under more favorable conditions of life. The modern cow, like her owner, lives under entirely abnormal conditions which must be altered if dairy herds are to be kept free from tuberculosis.

However, I will not take up your time by enlarging upon this obvious truth. I wish especially to emphasize the fact that, in men and animals, tuberculosis tends toward recovery, and that a very little help at the opportune moment, will change the entire course of the disease. In this belief I find myself in accord with Professor Conn, who says (Report of Storrs Agricultural Experiment Station, 1898) "The fact is, that the more experience accumulates, the more we learn that many of these incipient cases of tuberculosis are only temporary, and that the animals in question, if kept in a favorable condition, will soon recover and may live many years of useful life." C. S. Phelps, the agriculturist of the Storrs Experiment Station, gives the history of four tuberculous cows, two at least of which, seemed to have recovered their health entirely, and the other two were greatly benefited simply by hygienic living. I have no doubt that there have occurred thousands of similar cases.

De Schweinitz reported (Bulletin 13 of the Department of Agriculture, September 19, 1896, page 17) "An animal originally tuberculous kept at the Station of the Bureau of Animal Industry, has received about three thousand c.c. of tuberculin in different injections extending over a long time. The animal is now well and fat and has entirely recovered from tuberculosis."

On page 21 of Dr. Gilliland's paper, (Report on the Results Obtained in the Eradication of Tuberculosis from a Herd by the Use of Tuberculosis Vaccine and the Bang System, read in Toronto in August, 1911)—favorable comment is made on the result of the treatment of twelve shorthorn yearlings, which had reacted to tuberculin, with tuberculosis vaccine and tuberculin. The comment concludes with the statement, that the "treatment had a dis-

tinative curative effect" and concludes as follows: "With this knowledge at hand, it was decided to keep the valuable reacting animals of this herd isolated, and handle them in accordance with the Bang System, as well as to treat them with tuberculosis vaccine and *tuberculin*. (*italics mine*). The summary of the treatment was that the intravenous injection of tuberculosis vaccine was given. The dose depended upon the age, size and physical condition of the animal, and ranged from 4 c.c. to 10 c.c. of a standard suspension of tubercle bacilli of the human type. This was followed at intervals of seven days, with increasing doses of tuberculin until three doses were given. Then a second injection of tuberculosis vaccine was given, the dose being the same as in the first instance. This was followed by three weekly injections of tuberculin, *increasing* (*italics mine*) the dose with each injection. Finally, a third dose of tuberculosis vaccine was given, followed by weekly injections of tuberculin; increasing each dose as before, until the animal ceased to react." It appears that these animals were killed in the course of three years, after these injections, and in none of them was any active tuberculosis found.

An analysis of this meagre account of the use of tuberculin as a supplement to the intravenous injections of a suspension of human tubercle bacilli, leads us to ask whether the tuberculin was not the unrecognized curative agent, while the tuberculosis vaccine was probably inert. At all events, inasmuch as injections of humanized bacilli have, so I am informed, in numerous cases proved ineffectual, and inasmuch as the tuberculin was given in increasing doses, and *until the animal ceased to react* (*italics mine*) the conclusion seems perfectly obvious that these experiments should be repeated without the humanized tubercle bacilli.

Perhaps all this has been done. If so, I should consider it a great favor if I could be fully informed in the matter. While Dr. Gilliland neglects to state the amount of tuberculin he injected (seeming to think it of little consequence), it is not probable that he used anywhere near the amount Dr. de Schweinitz reported that he used to cure a tuberculous cow, (*viz*: 3000 c.c.). The latter authority is also delightfully indefinite regarding the size and frequency of his doses, and whether or not, the considerable amount of the agent used, was pure tuberculin or a dilution. If pure German tuberculin were used at present prices, this quantity at retail would cost about \$1000. If used as Dr. Harrison tells me he

used it, in a dilution of 1-60, bought at wholesale, with a discount for prompt payment, the cost would be for 3000 c.c., about \$50.00, which added to the cost of expert attendance, isolation and ordinary care of the animal might make the attempted immunization of cattle with tuberculin too expensive for a routine procedure. Yet, in cases of very valuable cattle, the process, if successful, would pay many times over.

It seems to me, gentlemen, that the veterinarians are in a position to render an undying service to scientific medicine, by undertaking the immunization of all tuberculous cattle against tuberculosis by the use of repeated gradually increasing doses of tuberculin, until the animal will no longer react. Your work has proved beyond controversy, that tuberculin has no effect upon healthy cattle and that an injection of a drachm of a two per cent dilution of pure tuberculin will cause a reaction in ninety-seven per cent of animals in any state of active tuberculosis; except in the advanced stages, when the body cells are no longer susceptible to tuberculin.

On the other hand it seems to me, that the physicians should take a leaf from your book and insist on testing all children for tubercular infection. We unfortunately have ample proof that seven children out of every ten at seventeen years of age, have, or have had, tuberculosis, and that over 90 per cent of all human beings at death show that they have at some time in their lives, suffered from tuberculosis. This lesion should be looked for in every case in childhood and young adult life, and whenever found it should be treated with tuberculin until complete immunization is brought about, just as I have urged you to test all cattle and treat all the reactors.

It will be impossible to rid the world of *human* tuberculosis unless the bovine type can also be wiped out. Dr. Salmon said in 1904 (Maryland Medical Journal, p. 92, February, 1904), "The human tubercle bacilli are generally much more saprophytic in their characters, and far less virulent than those from most other mammalian sources, and it seems that the human organism has the power of attenuating these bacilli and gradually making them less and less harmful. But this influence for good must be continually counteracted by the infusion of extremely pathogenic germs from animal sources." Probably, although this assertion admits of some argument, bovine and porcine tuberculosis will never be ban-

ished from the earth while any large percentage of human beings are suffering from the disease. We have found that small, gradually increased doses of tuberculin will render a human being immune to the bacilli. The same agent that provokes the reaction in a test dose and shows without question that the victim is suffering from active tuberculosis, calls from the body cells the antibodies which will gradually destroy the bacillus and restore the body to health. The susceptibility of the body cells is a criterion of their power to evolve the antibodies which will bring about a state of immunity. These seemingly opposed states are co-relative and inter-dependent, and this is why the dose of tuberculin must be gradually increased to keep up a formation of the antibodies and to gradually overcome the encroachments of the tubercle bacilli. This is why dishonest dealers can "plug" cattle so that they become immune for a considerable time to the standard test dose. For the same reason, cattle suspected of having been plugged, should receive twice or three or even more times the usual test dose, so that the immunity to the standard dose gained by the first test will be overcome and the animal will react.

In testing human beings, we use from three to five doses of tuberculin, increasing each succeeding dose to five or ten times the strength of its predecessor, until we are practically sure that the patient cannot react: in other words, has no susceptibility to tuberculin and consequently, no active tuberculosis in his body, unless of course, as said before, the disease has advanced so that the susceptibility of the cells to tuberculin has been exhausted. This is a wonderful field of research whose confines are far beyond our ken. The two professions, the veterinary and the medical, or rather, the two branches of the one profession, that of the healing art, are requisite and necessary to each other just now, as never before. Let us unite, and advancing shoulder to shoulder, pass on into that great heritage of boundless knowledge which is opening before us.

While many of us may not live to see where this alluring research will lead, it is not unreasonable in view of the enormous strides which experimental medicine has made in the last decade, to assert that another half score of years will make equally astonishing advances, and that in many directions, notably in the control and treatment of tuberculosis, most of us will live to see a degree of success which has until the last few years seemed an iridescent dream.

The complete banishment of the "Great White Plague" from the list of human miseries, can no longer be asserted to be an impossibility. Our progress toward the goal in handling human tuberculosis has been wonderfully encouraging in the past few years. I hope that my feeble words will stir up our brethren, the veterinarians, to renew their attack on bovine tuberculosis. From this form of the disease, a large percentage of human infants are infected every year, and this source of infection must be wiped out through your efforts collectively and individually.

FEDERAL AID FOR RURAL ROADS. The sum of \$85,000,000 of federal funds is made available for the construction of rural roads, by the passage of the Federal Aid Road Bill which became a law on July 11, 1916. Of this sum \$75,000,000 is to be expended for the construction of rural post roads under cooperative arrangements with the highway departments of the various states, and \$10,000,000 is to be expended for roads and trails within or partly within the national forests. The act limits the federal government's share in road work in cooperation with the states to 50 per cent of the estimated cost of construction.

CATTLE SCABIES NEARLY EXTINCT. Seven Texas counties and a portion of another one are released from federal quarantine for cattle scabies by an order effective July 1. This order marks almost the last stage in the fight against this disease, which began in 1905. At that time 1,269,844 square miles were quarantined on this account. After July 1 only 3,817 square miles of this area will remain in quarantine.

A newspaper item states that Dr. Richard Ebbet formerly of Grand Island, Nebraska, has been deported from Ireland by the British Government. He has been in Ireland for about four years, twenty miles from Dublin. It is reported that he was returned to this country because he had written to friends here of the conditions in Ireland. It is stated that Dr. Ebbet will take up the matter with the Department of State at Washington and that he contemplates some kind of legal action against the British Government.

OBSERVATIONS ON 2800 PIGS INOCULATED WITH HOG CHOLERA VIRUS

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The following observations and experiments have been made upon 2800 pigs, inoculated for the production of hog cholera virus, at the Minnesota State Serum Plant, during the period of approximately two years ending December 31, 1915. The virus obtained from these pigs was used mainly for the hyperimmunization of hogs for the production of anti-hog cholera serum (Dorset-McBride-Niles method), although considerable was also used in the work of routine serum-virus vaccination (so-called "double treatment"). The observations recorded in this paper may not appear to be of any particular significance, in fact some of the conclusions drawn are already known to most workers with hog cholera, in a general way, but the fact that there are no published data on many of these points has prompted the author to report them.

When the word "virus" is used, we refer to the defibrinated blood obtained from a pig sick with acute hog cholera, the blood being defibrinated mechanically immediately after drawing, rather than allowing it to coagulate spontaneously. In a small number of cases (not over 5%) the blood can not be satisfactorily defibrinated immediately, but in these cases it will usually coagulate upon 24 hours standing at refrigerator temperature (4°C.). Experience has shown that it does not pay to use this blood, either separately or by mixing it with the blood from other pigs. The failure to properly coagulate is probably due to the absence or insufficient amount present of some one of the fibrin elements, and when the poor blood is mixed with the good, small shreds of fibrin are formed, making it difficult to handle and dangerous to use for hyperimmunization purposes. Almost without exception the pigs which yield the non-coagulable blood show very extensive hemorrhagic lesions on autopsy.

NATURAL IMMUNITY TO HOG CHOLERA. It is very interesting to note the fact that of the 2800 pigs inoculated, 390 (13.9%) failed to succumb to the infection. Failure to succumb means that the pigs either did not die of cholera, or did not at any time become sick enough to warrant slaughter for the purpose of obtaining viru-

lent blood. The optimum time for killing the pigs is usually determined clinically, the experience gained through observations made on several thousand pigs serving as a valuable guide. Experience has shown that it is best to allow the inoculated pigs to reach the height of their reaction, based largely on the temperature, but with other clinical symptoms taken into consideration, and bleed them before they become too weak. The pigs killed in the advanced stages of the disease will usually yield blood rich in the secondary invaders common to hog cholera. This is not only undesirable, but also unnecessary for the production of a potent anti-hog cholera serum.

The reactions following the injections of virus varied between the two extremes possible, namely, from no reaction that was noticeable, up to death in as short a time as five or six days (peracute hog cholera). Some of the pigs which did not die became severely ill, however, and then usually made a quick recovery. In the periods during which the pigs were under observation, careful clinical records were kept as far as conditions permitted. The necessity for handling large numbers of pigs in rather crowded quarters, at certain times of the year, prevented the keeping of detailed individual clinical records at such times.

The following table concerns the 390 pigs which failed to succumb. For convenience they have been divided into six groups, determined by the highest temperature shown following inoculation. Temperatures were taken once daily, at about 8 A. M., usually not earlier than the fourth day following inoculation. A marked rise of temperature before the fourth day could hardly be attributed to the injection of the filterable virus of hog cholera. It is much more reasonable to suspect prior infection, or a contaminated virus, where a marked rise of temperature is noted before the fourth or fifth day, or when death occurs before the fifth or sixth day.

TABLE 1.

Showing the percentage of 390 pigs (survivors) exhibiting different grades of susceptibility and immunity, classed by maximum temperatures recorded following inoculation.

Limits of maximum temperatures	Number of pigs	%	Grade of reaction	Grade of immunity
101.8-102.8	39	10.0	None	Complete
103.0-103.8	101	25.9	Slight	High
104.0-104.8	120	30.7	Moderate	Slight
105.0-105.8	84	21.5	Marked	None
106.0-106.8	36	9.3	Severe	None
107.0-107.4	10	2.6	Extreme	None

This grouping is entirely arbitrary, but in a general way the temperature reaction is a very good gauge for roughly determining the condition of the pigs. Once in a while a very sick pig will not show much of a temperature reaction, while on the other hand some pigs that appear to show little or no clinical symptoms frequently will show a surprisingly high temperature reaction. In the group showing slight reactions, as a rule there was rarely any other clinical symptoms manifest besides the slight rise in temperature. In the group showing moderate reactions, usually the pigs would be "off feed" for a day or so, and then show no further disturbance. In the groups showing "marked", "severe" and "extreme" reactions, very frequently there would be such symptoms as anorexia, depression, diarrhea, conjunctivitis, etc., for a day or so, but the condition of the pigs hardly warranted slaughter. In most such cases the pigs would be given a respite of twenty-four hours, at the expiration of which time the condition would usually be either unchanged or improved. In a few instances such pigs succumbed.

In a general way these 390 pigs might be divided into two great classes: (a) those which proved to be immune, or nearly so; and, (b) those which reacted noticeably to the injection of the virus, but made a recovery. It is interesting to note that no pigs survived a recorded temperature higher than 107.4°F. Table 2 shows the temperatures of six pigs, selected to show examples of the six different grades of reactions referred to.

TABLE 2.

Temperature reactions in pigs with various grades of natural immunity.

Reaction (grade)	Pig No.	Days following inoculation								
		6	7	8	9	10	11	12	13	14
None	6516	102.0	102.4	101.2	101.6	102.2	100.8	101.2	101.4	101.4
Slight	6279	101.6	102.0	103.8	101.0	102.0	102.4	101.6	102.2	101.8
Moderate	5967	103.8	104.0	104.2	104.0	102.4	103.0	101.0	101.6	
Marked	6507	102.6	103.0	103.0	104.0	105.6	103.0	102.2	103.0	102.2
Severe	5691	104.0	106.0	103.4	104.0	103.2	102.4	102.4	101.8	
Extreme	5687	103.2	107.4	105.0	106.0	102.0	106.0	103.2	103.2	

It is interesting to note that the foregoing temperature reactions very closely simulate those shown by test pigs which have received an injection of virulent virus (usually 2.0 c.c.) simultaneously with various amounts of anti-serum (usually 10.0 to 25.0 c.c.), in the potency tests to which the serum is subjected before its distribution and use. Pigs receiving the larger test doses of serum usually show temperature reactions corresponding to pigs 6516 and

6279, reactions graded as "none" or "slight". Pigs receiving the smaller doses may show reactions corresponding to the other grades, from "moderate" to "extreme", depending upon the relative potency of the serum and virulence of the virus.

IMMUNITY AND SUSCEPTIBILITY ACCORDING TO AGE. In order to determine, if possible, at what size or age, estimated from the weight of the pigs, the maximum and minimum resistance occurred, a study of the weights (at time of inoculation) of the survivors was made. It was found that most of the pigs used weighed between forty and one hundred and ten pounds (40-110 lbs.), with a small number both above and below these limits. The following table will show the pigs grouped according to ten pound limits, showing the number inoculated in each group, the number of survivors, and the percentage.

TABLE 3.

Showing number of survivors in different groups of pigs, classed according to weight.

Weight limits (lbs.)	Number of pigs inoculated	Number failed to succumb	Per cent
21- 30	10	1	10.0
31- 40	32	4	12.5
41- 50	125	10	8.0
51- 60	320	57	17.8
61- 70	498	79	15.9
71- 80	525	75	14.3
81- 90	506	71	14.0
91-100	459	57	12.4
101-110	237	28	11.8
111-120	71	5	7.0
121-140	18	3	16.6
	2800	390	13.9

Leaving out of consideration the pigs which weighed less than forty-one pounds, and those which weighed more than one hundred and ten pounds, there being but relatively few pigs of these weights, it would appear that resistance is lowest in pigs weighing from forty-one to fifty pounds, and greatest in pigs weighing between fifty-one and sixty pounds, with a gradual decrease in resistance being shown by the pigs as the groups increased in weight. Approximately eighteen per cent of the pigs weighing from fifty-one to sixty pounds failed to succumb, whereas only twelve per cent of the pigs weighing one hundred and one to one hundred and ten pounds survived.

We were not surprised to notice the extreme susceptibility of pigs weighing less than fifty pounds. Experience has shown that at this age mortality from cholera is very high, opportunities having been offered for making observations on herds in which cholera had made its appearance in a natural way, and such herds containing pigs and mature hogs of various ages. Even pigs from immune sows are quite susceptible at this age and weight (40-50 lbs.), provided they have been entirely weaned for several weeks. It is believed that such pigs have been protected during the nursing period, probably through the agency of antibodies in the milk. At weaning time this protection (passive immunity) is taken away, and infection follows exposure very rapidly. Several experiences with vaccinating pigs of this age with the double treatment would even lead us to believe that there is a hypersusceptibility at this time, possibly due to the disturbances caused the young pigs incident to the change of feed following weaning.

Very little was known of the history of the great majority of the 2800 pigs represented in this report, but a very large proportion of them were shipped into the South St. Paul stock-yards from points in North Dakota, Montana and Canada. It is highly improbable, except in rare instances, that pigs of the above weights (50-110 lbs.) had been vaccinated previously. Certain local conditions, such as shortage of feed, sometimes necessitates shipping young pigs to market, but the owners and shippers usually do not go to the expense of having pigs vaccinated before shipment. Our buyer knew our wants, and his instructions were to buy Dakota, Montana and Canadian pigs whenever they were available. We believe that pigs from these sources would be more susceptible, would probably not have been exposed to infection or previously vaccinated.

TIME OF APPEARANCE OF HEIGHT OF REACTION. The day on which the height of the reaction took place, following the inoculation with virus, estimated by the highest temperature recorded, has been determined. It would appear interesting to note, in this connection, that a majority of the pigs which failed to succumb apparently reached the height of their reaction twenty-four hours earlier than in the case of the pigs which died or were killed in a more or less moribund condition. Of the 390 survivors, 77 pigs (19.7%) showed a maximum temperature on the sixth day. On the other hand, a series of 390 consecutive pigs which died or were

killed showed 78 pigs (20.0%) with highest temperatures on the sixth day, but 149 pigs (38.2%) with the highest temperature on the seventh day, and 69 pigs (17.7%) on the eighth day. These facts are set forth in tabular forms as follows:—

TABLE 5.

Showing days after inoculation when maximum temperatures were recorded in the 390 survivors, compared with 390 consecutive fatal cases.

Day of maximum temperature	Pigs that failed to succumb		Pigs that died or were killed	
	Number of Pigs	%	Number of Pigs	%
4	8	2.1	1	0.2
5	38	9.7	38	9.7
6	77	19.7	78	20.0
7	53	13.6	149	38.2
8	54	13.8	69	17.7
9	51	13.1	25	6.4
10	26	6.7	17	4.4
11	33	8.4	4	1.0
12	16	4.1	6	1.6
13	16	4.1	0	0.0
14	7	1.8	2	0.5
15	5	1.3	0	0.0
16	6	1.6	1	0.3
Totals	390	100.0	390	100.0

These observations coincide very closely with those reported by Craig and Whiting¹, on the temperature curves drawn from the temperature records of 900 pigs used for testing serum or vaccinated by the double method. The average daily temperatures show the highest on the sixth day. In another series of 250 pigs, inoculated with hog cholera virus, which died or were killed between the seventh and fourteenth days, a temperature curve drawn from the temperature records shows the highest average temperature on the seventh day.

MAINTENANCE OF VIRULENCE OF HOG CHOLERA VIRUS. The maintenance of a strain of hog cholera virus of maximum virulence is of the greatest importance in the production of highly and uniformly potent anti-hog cholera serum. In a general way the virulence of the virus is reflected in the potency of the resulting anti-serum. In our work we aimed to keep only one strain of virus going, although other workers have attempted to keep a number of strains going. Our serum was prepared for use in a limited territory (Minnesota) and the reasons advanced for using a number of strains of virus, principally to produce a polyvalent serum, did

not seem necessary as long as our strain of virus did not show any signs of weakening, and the field results with the serum continued to be satisfactory.

On the other hand, it is doubtful whether it is possible to keep a given strain of hog cholera virus pure, under conditions usually met with in serum plants, on account of the extremely contagious nature of the virus. It is not a practical proposition, except for purely experimental purposes, where the item of expense can be forgotten.

Nevertheless it would appear that we succeeded fairly well in keeping our strain of virus up to a degree of extreme virulence, really the most important point after all, when it was possible to make frequent passages through susceptible pigs. At the time this particular strain of virus had just gone through its 120th passage, claim was made² that it was as near to being a fixed virus as it would be possible to get it. At the time this paper is being prepared it is going through its 137th passage. The problem of a fixed virus is discussed later in this paper. Briefly, our plan was to select a pig from each group inoculated, a pig that showed an early and marked reaction to the injection of 2.0 c.c. of seed virus, usually made intramuscularly. The animal was killed by bleeding from the throat, as aseptically as possible, the blood defibrinated, and then placed in a refrigerator. A careful autopsy would then be held on the pig, and if undoubted lesions of hog cholera were found, however slight, and not contaminated with any other infection, as far as macroscopical examination showed, a part (usually about 250.00 c.c.) of the blood was reserved and divided into two portions. One portion was preserved with a 0.5% phenol solution, while no preservative was added to the other. The virus was then placed in sealed containers and kept in a refrigerator at about 4°C. until used.

In a number of instances, when frequent passages of the virus were not made, there was an apparent decrease in virulence noticed in the unpreserved sample, when used for inoculation purposes. The preserved sample of the same passage, in most cases, did not lose its virulence so rapidly as the unpreserved portion. This is thought to be due to the growth and action of the organisms contaminating the unpreserved sample. However, as long as the latter remained "sweet" (absence of putrefactive odor), the virus usually proved to be of satisfactory virulence. Although phenol as a pre-

servative in strengths as high as one per cent will not destroy the hog cholera virus, our reasons for attempting to keep virus without a preservative were simply along the line that the phenol might possibly attenuate the virus, if only to a slight degree, which was undesirable if it could in any way be prevented.

EFFECT OF AGE ON VIRULENCE OF SEED VIRUS. The length of time that virus would remain virulent under the most favorable conditions was variable. In a few cases where tests were made to determine this point, the virulence did not seem to have been lost after several months storage in the refrigerator under the conditions already named. Table 6 gives the results of two of the tests.

TABLE 6.

Experiments to determine the effects of age on the virulence of hog cholera virus.

Virus No.	Age, days	Pig No.	Wgt. lbs.	Date inoc.	Max. temp.	Day	Outcome	Days	Average		Inc. Inc.*
									Old	Fresh	
110	216	7434	49	11-17-15	105.0	9	D	17	20.0	8.6	-11.4
110	216	7435	30	11-17-15	105.2	8	D	23			
120	131	7433	55	11-17-15	106.8	8	K	9	9.5	8.6	-0.9
120	131	7443	32	11-17-15	106.4	9	K	10			
124	93	7438	45	11-17-15	107.0	9	K	9	10.0	8.0	-2.0
124	93	7440	30	11-17-15	105.0	10	K	11			
125	80	7442	54	11-17-15	107.2	8	K	10	10.5	7.5	-3.0
125	80	7444	32	11-17-15	107.4	10	K	11			
126	68	7437	58	11-17-15	106.2	9	K	9	8.5	7.5	-1.0
126	68	7439	40	11-17-15	106.8	7	K	8			
126	162	7617	52	2-19-16	105.2	5	K	6	8.0	7.5	-0.5
126	162	7637	48	2-19-16	105.8	7	D	10			
127	37	7432	44	11-17-15	107.0	7	K	10	10.5	8.0	-2.5
127	37	7436	25	11-17-15	105.8	8	K	11			
127	132	7639	53	2-19-16	106.4	7	K	7	7.0	8.0	+1.0
127	132	7625	50	2-19-16	106.0	7	K	7			
128	7	7431	59	11-17-15	109.6	8	K	8	8.0	8.7	+0.7
128	7	7441	42	11-17-15	107.4	7	K	8			
128	102	7627	50	2-19-16	106.2	7	K	7	9.5	8.7	-0.8
128	102	7622	67	2-19-16	106.2	8	K	12			
129	49	7642	52	2-19-16	108.2	7	K	11	11.5	13.0	+1.5
129	49	7632	72	2-19-16	106.4	7	K	12			

*Increase or decrease in virulence, expressed in days. —loss; +gain.

EFFECT OF INJECTIONS OF VARIOUS AMOUNTS OF VIRUS BY DIFFERENT METHODS. The amount of virus injected, or the manner of introduction into the body of the pig, seemed to be no factor in the appearance of symptoms following inoculation. Two cubic centimeters would invariably bring a pig down as soon as ten cubic centimeters, and intravenous injections did not seem to shorten the incubation period, when compared with intramuscular or subcutaneous injections made with the same virus, at the same time, on pigs in the same group. A few of these experiments are shown in Table 7.

TABLE 7.

Experiments to determine the effects of the injection of different sized doses of hog cholera virus, subcutaneously and intravenously.

Pig No.	Wgt. lbs.	Date inoc.	Virus No.	Amt. c.c.	X	Highest temp.	Day	Outcome
5301	76	3-31-15	108	2.0	S	103.4	8	Remained well
5302	46	3-31-15	108	10.0	S	103.4	10	Remained well
5303	78	3-31-15	108	2.0	S	107.0	7	Killed 7th day. Cholera
5494	66	4-12-15	110	2.0	S	106.4	8	Killed 9th day. Cholera
5495	52	4-12-15	110	5.0	S	106.8	9	Killed 9th day. Cholera
5611	65	4-18-15	111	3.0	S	106.2	7	Killed 8th day. Cholera
5617	72	4-18-15	111	5.0	S	107.0	6	Killed 8th day. Cholera
5621	62	4-18-15	111	3.0	S	107.0	9	Killed 9th day. Cholera
5624	75	4-18-15	111	5.0	S	106.6	9	Killed 9th day. Cholera
5755	55	4-23-15	112	5.0	S	106.2	6	Killed 9th day. Cholera
5759	57	4-23-15	112	5.0	I	105.6	7	Died 9th day. Cholera
5760	55	4-23-15	112	2.0	S	106.6	8	Killed 9th day. Cholera
5761	63	4-23-15	112	2.0	S	107.4	7	Killed 8th day. Cholera
5762	65	4-23-15	112	5.0	I	106.4	7	Killed 9th day. Cholera
5765	67	4-23-15	112	10.0	I	105.8	6	Sick 3 days. Recovered
5768	62	4-23-15	112	2.0	S	106.4	8	Killed 9th day. Cholera
5770	53	4-23-14	112	2.0	S	104.6	8	Sick 3 days. Recovered
5888	55	4-28-15	112	1.0	S	106.6	8	Killed 9th day. Cholera
5893	74	4-28-15	112	10.0	S	107.6	9	Killed 9th day. Cholera

x S—subcutaneously. I—intravenously.

FIXED VIRUS OF HOG CHOLERA. The problem of obtaining a fixed virus of hog cholera is one attended with a number of difficulties. Reichel³ was the first to suggest the possibilities, as well as the desirability of such a virus, while the writer⁴ has already pointed out some of the difficulties of the problem. One of the greatest difficulties to meet and overcome, perhaps, is the fact that hog cholera is an infection that is very frequently complicated, a number of organisms of varying degrees of pathogenicity playing a part in the disease. This is not so true of a disease like rabies,

at least in the light of our present knowledge, a fixed virus of rabies being obtainable by a number of frequent, successive passages through rabbits, and secondary infections appearing to play little or no part in the disease itself.

In the production of anti-hog cholera serum, the virus pigs are usually killed in a more or less moribund condition, and not allowed to die, when death can be anticipated. Here the personal factor enters into the problem, and there is not a little divergence of opinion on the question as to when the sick virus pig is in the best condition for bleeding, in so far as the virulence of the virus is concerned, its concentration, the amount to be obtained per pound of body weight and its relative freedom from large numbers of organisms of the class of secondary invaders.

The sicker the pig, the greater the chance for the blood stream to be entered by these secondary invading organisms, most of them undoubtedly coming from the intestinal canal. They easily gain entrance to the circulation due to the weakened condition of the pig and the lowered resistance offered by the relaxed tissues. This is an important point, already briefly touched upon, when the blood is to be used for hyperimmunization purposes, due to the danger of producing a bacteriemia in the hogs receiving intravenous injections of from one to two litres of the defibrinated blood.

Table 8 shows a summary of one passage of our virus. Three lots of pigs (45 pigs in all) were inoculated with 2.0 c.c. of seed virus No. 80, each of the three lots being inoculated on different days. Six pigs proved to be non-susceptible, while one pig died from causes other than hog cholera. The remainder (38 pigs) either died or were killed about the eighth day (average 8.1 days). Summaries of the other passages made during 1914 and 1915 (60 in all) showed slight variations, of course, passage No. 80 being selected as typical.

TABLE 8.
Summary of a passage of hog cholera virus.

PASSAGE NO. 80						
Lot No.	No. Pigs	Date inoc.	No. immune	D. or K. cholera	D. or K. other causes	Average Days
44	8	5-23-14	2	5	1	8.4
45	20	5-26-14	2	18	0	7.8
46	17	5-28-14	2	15	0	8.1
Totals	45		6	38	1	8.1

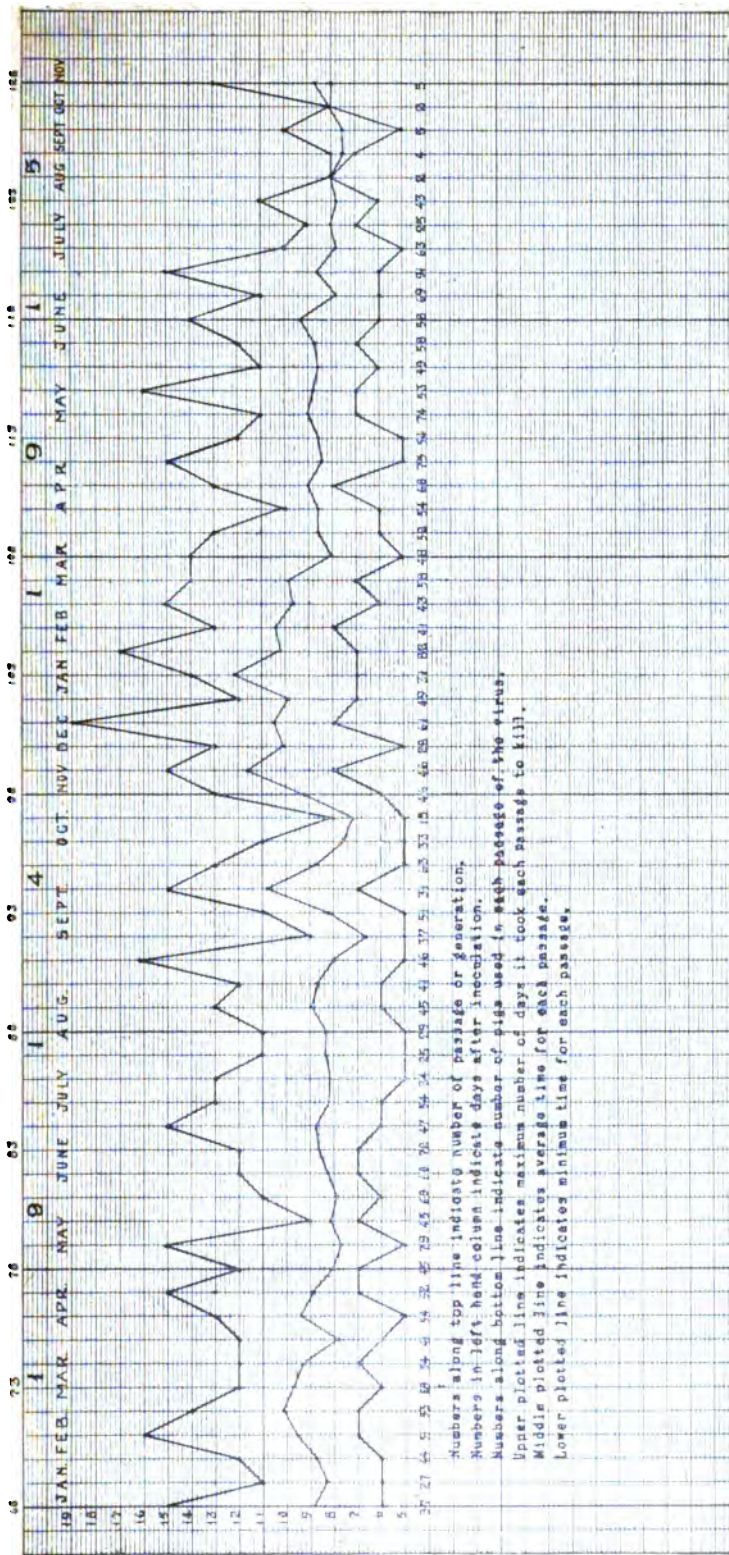


CHART 1. Showing variations in virulence of a strain of hog cholera virus, through 60 passages. (generations), extending over a period of two years, 2410 pigs having been used during this time. The 390 pigs which failed to succumb are not considered in computing the averages.

The accompanying chart (No. 1) shows that the majority of the 2410 pigs were killed on the eighth or ninth day after inoculation. The virus obtained was used for hyperimmunization purposes at the rate of five to six cubic centimeters per pound body weight, and the resulting serum proved to be quite uniformly potent, when the hyperimmunes were bled on the eleventh, eighteenth and twenty-fifth days following hyperimmunization, and the serum subjected to the standard test of the Bureau of Animal Industry.

The middle line in the chart is the average number of days after inoculation before the pigs died or were killed, all pigs inoculated with a certain passage of virus being placed in one group, and the number of pigs in such groups varying from 2 to 91. The upper line is the maximum number of days in each such group, and the lower line is the minimum number of days in which a pig was killed from each group. If a pig was killed or died later than the nineteenth day, it is not included. Likewise, pigs dead or killed before the fifth day are excluded, on account of the probability of prior infection or some other cause for death.

ACKNOWLEDGMENT. The author takes this opportunity to thank Dr. H. C. H. Kernkamp, who was associated with him for about eighteen months of the time covered by this report, and Dr. J. T. E. Dinwoodie, also associated with him for about nine months, for valuable assistance rendered in making inoculations, holding autopsies and recording the lesions found.

SUMMARY. 1. Of 2800 pigs inoculated with a virulent strain of hog cholera virus, 390 (13.9%) failed to succumb to the infection.

2. Reactions shown by the inoculated pigs which failed to succumb, varied between wide limits, indicating all grades of susceptibility and immunity to hog cholera.

3. No pigs survived a temperature higher than 107.4°F.

4. Pigs weighing between 40 and 50 pounds showed greatest susceptibility, only 8% of the pigs inoculated at this weight surviving.

5. Pigs weighing between 50 and 60 pounds at the time of inoculation apparently showed the greatest resistance, judged by the percentage which failed to succumb, resistance slowly decreasing as the pigs became heavier.

6. Pigs which failed to succumb reached the height of their reaction (temperature) most frequently on the sixth day.

7. Pigs which died or were killed when moribund reached the height of their reaction most frequently on the seventh day.

8. By frequent passages of a strain of virus through susceptible pigs, and carefully selecting the seed virus pig from each group, a virus has been obtained which can be depended upon to bring pigs down on the eighth day with a fair degree of regularity.

9. Pigs inoculated with virus of different ages, up to 162 days, succumbed quite regularly, within a few days of the time necessary for the same virus to bring the pigs down when comparatively fresh.

10. Virus 216 days old had apparently lost its infectivity.

11. Pigs inoculated with varying amounts of virus (1.0 to 10.0 c.c.) came down in the usual length of time, regardless of the amount injected or the manner of introduction.

CONCLUSIONS. 1. On the average it is safe to assume that about 14% of pigs weighing between 40 and 140 pounds have sufficient natural immunity to resist fatal infection with virulent hog cholera virus. This fact should be kept in mind in all experimental work with hog cholera, especially the testing of anti-hog cholera serum, and conclusions should not be drawn from experiments made on a small series of pigs.

2. Pigs appear to be most susceptible during the period between weaning time and when they reach about 50 pounds in weight. Pigs of this size, however, are not economical for routine virus production. Pigs as heavy as 120 pounds show as great a degree of susceptibility as the younger pigs, according to our observations.

3. Virus pigs will usually show the height of their reaction at or about the sixth or seventh day. For some unexplained reason the pigs which failed to succumb reached the height of their reaction a day earlier, on the average, than those pigs which died or were killed. It may be that the reaction to the filterable virus occurred before the pig was sufficiently weakened to invite the invasion of secondary organisms from the intestinal canal, in which case recovery followed.

4. With certain restrictions attached to the meaning of the term "fixed virus", such a virus for hog cholera may be obtained by frequent passages through susceptible pigs, the number of such pigs being large enough to allow considerable choice in selecting the seed virus pig from each group.

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FURTHER STUDIES IN X-RAY DIAGNOSIS IN VETERINARY MEDICINE*

LOUIS GRIESSMAN, New York City.

At the last convention I gave a brief outline of the history, development, diagnostic and therapeutic value of the X-ray as it is used in veterinary medicine and surgery. Detailed experiments and especially studies in tuberculosis and glanders of the larger animals were difficult to undertake because of lack of material. Work of such tremendous importance must be financed by and performed under the auspices of the state, by veterinarians who are competent and able to use and understand the X-ray. The state does not permit, nor is it practical for veterinarians, to keep the larger tubercular animals in the laboratories in the center of the city. Such work, however, would be invaluable to the state and not only could plates be taken of suspected animals and kept under observation, but the progress of the lesions could be noted and recorded on the plates at stated intervals.

For the radiographic examination of the larger animals we need a more powerful apparatus than that of the kind ordinarily used in the examination of such parts, as the hip and the stomach. The fluoroscopic examination of the lungs of a horse or cow, for example, is comparatively simple, although the distance to penetrate is great, the density is little. The X-ray apparatus may even be taken into the field at any distance from the source of electrical supply, and then connected to an automobile for its motive power; a detailed description of how to hook up an X-ray machine to the hind wheel of an automobile is described in a recent number of the *Journal of the American Medical Association*.

Let us turn for a moment to some of the average cases met with in general practice where roentgenology is invaluable. In order to determine whether a fracture is well set, it is necessary to take two views at right angles to each other; for although the antero-posterior view may show that the fragments are apparently in correct alignment, the lateral view may show overlapping of the bones. This cannot be determined in any other way.

*Presented at the meeting of the New York State Veterinary Medical Society, Ithaca, N. Y., August 3, 1916.

In the examination for foreign bodies, the antero-posterior view will show the shadow of the foreign body, but it will not show its depth. Therefore, it often becomes necessary both in the examination for foreign bodies and for fractures to make a stereoscopic set of plates. In order to do this, two plates are made, the plates are put into the plate holder in exactly the same position and exposed one immediately after the other; the tube, however, is shifted one and a half inches to the right of the median line for the first plate and one and a half inches to the left of the median line for the second plate. The total tube-shifting is therefore three inches, which is the distance between the two pupils of the eyes. The plates are then, after having been developed and dried, put into a Wheatstone Stereoscope and on examination are found to give three dimensions or the value of depth. This method is also very valuable to determine the direction of a sinus which is so tortuous that it cannot be probed. In this type of case a bismuth paste is injected into the sinus and a stereoscopic set of plates will determine its position in space and whether or not the sinus reaches the bone. An ordinary flat projection would show the sinus shadow superimposed upon the bone shadow.

The study of bone lesions requires plates which show not only the morphology of the bone, but they must also show good bone detail or structure. In the smaller animals we must have a soft tube for this type of work. One study was made along these lines after an experimental fracture of a chicken's femur. It was noted when the fragments were corrected a large amount of callus was deposited as early as the fifth day. After the callus is deposited, it takes a considerable length of time, from three to four weeks before the black line (callous line) between the fragments disappears. As long as this line persists, it would be unsafe to remove the cast and the roentgenogram therefore serves as an indicator as to when union is completed.

Another type of studies was made in the following manner: this consists in the study of the uterus and urinary bladder. The only way in which to visualize the urinary bladder and the uterus is by injecting some opaque innocuous fluid as the salts of a heavy metal. Since the density of the shadow varies with the atomic weight of the obstruction, we use a ten per cent solution of collargol, a silver preparation, or a solution of thorium nitrate, which ful-

fills the the requirements. The latter is preferable, as it is transparent and does not cause stains.

Technic: One to two ounces of a ten per cent solution of col-largol or thorium is injected into the bladder through an urethral catheter, a plate is then made with the solution *in situ* and any polyp or other tumor growing into the bladder is therefore visualized and thus we may also see malformations of the bladder as a diverticulum or an abnormality in the size of the bladder.

This now brings our studies to the gastro-intestinal tract. By the use of the Roentgen ray we can visualize the lumen of any part of the gastro-intestinal tract.

Technic: The dog or other animal is given two ounces of bismuth subcarbonate or barium sulphate in milk or in porridge; then several plates are made in the antero-posterior and lateral position. A plate or fluoroscopic examination is then made every hour for six hours. The diagnosis is then dependent on the presence of defects, the amount of peristalsis and the rate of emptying.

Numerous experiments have been made along the lines above indicated, but the work can only be done as the material presents itself. Nor can it be done indiscriminately because of the expense involved. Let me again call your attention to the tremendous value of this work, and the absolute necessity that the state or some endowment create a fund which will finance this work and what is just as important, it should supply suitable animals for the study of the disease in the living.

The following pictures will illustrate the points mentioned in this paper.



FIG. 1.
Malformation of bone. (congenital)..



FIG. 2.
Fracture of tibia in dog.



FIG. 3.

Bullet and amputation of left leg in dog showing periostitis of end of bone.

THE REQUIREMENTS OF THE PHYSICAL EXAMINATION OF DAIRY CATTLE IN ACCORDANCE WITH THE REGULATIONS OF THE STATE AND CITY CODES*

A. SILKMAN, New York City.

Among the rules and regulations that have been adopted by the Board of Health for the production and sale of milk other than Grade A Raw, is the following:—

“Only such cows shall be admitted to the herd as have been physically examined by a regularly qualified veterinarian and declared by him to be healthy and free from tuberculosis in so far as a physical examination may determine that fact. Such an examination of all cows shall be made at least once a year.” A physical examination of dairy cows shall consist of the following procedure:

1. General condition of each cow as a whole.
2. Commencing on one side of a cow examination shall include:
 - a. The submaxillary glands
 - b. The retropharyngeal glands
 - c. The preescapular glands
 - d. The auscultation of the left lung
 - e. The precrural glands
 - f. The supermammary lymph glands
 - g. Lift the tail and examine for any purulent vaginal discharges
 - h. Palpate the udder
3. Going on the other side of the cow, conduct in reverse order an examination similar to that under preceding clause.
4. If anything is found to be wrong in the physical examination as above given, the temperature is to be taken and other details gone into thoroughly, such as sampling the milk, etc.

I appreciate the honor that has been bestowed upon me in asking me to address you where there are so many able men whose

*Presented at the meeting of the New York State Veterinary Medical Society, Ithaca, N. Y., August 3, 1916.

practice along these lines has made them more or less expert. It is not easy to make a correct diagnosis, nor is the following of a set rule always productive of satisfactory results. I have for a long time been intimately connected with this class of work, and am conscious of the fact that a veterinarian who is in close touch with this branch of his profession, diagnoses not always by rule or by positive signs, so called, but often by a sort of intuition, which comes from long practice and association with these cases. The ordinary practitioners frequently pass by some of these cases without discovering the existence of tuberculosis. For this reason, it is wise to depend only upon the best expert examiner, for he does not speculate nor guess. He knows.

I am advised that Drs. Moore and Udall are carrying on research work and testing out the use of the sputum cup in making clinical examinations in conjunction with physical examinations, and this work should be watched with interest by veterinarians. These men are clever and conscientious, and if their work should prove successful, it is hard to estimate the great economic value of their efforts.

SUGGESTION. The certificates that are sent in to the Department of Health by veterinarians of their examinations, simply state that they have examined so many cows and find them free from any symptoms of tuberculosis or any infectious disease. Would it not be better for the veterinarians to have certificates with the names of all superficial glands printed in, and which could be checked off as having been examined? This would show that a careful examination had been made.

It is reported that through shipments of Dipped Cattle from Jacksonville, Fla., is now possible, under federal inspection, when the shipment is large. This results from the building of a large dipping vat and non-infectious pens, and materially assists Florida in her trade relations with other states.

Every member of the 1916 graduating class at the veterinary college at Ames, Ia., has gone into practice save one. The one exception has been granted a fellowship at the Rockefeller Institute for Medical Research at New York City.

Dr. William Killough of Elk City died of brain trouble at the home of his parents at Ottawa, Kans.

CLINICAL AND CASE REPORTS

"Knowledge is born in laboratories and in the experience of the thoughtful. It develops form in the journals and 'when dead it is decently buried in books'."

FOREIGN BODIES IN THE DIGESTIVE TRACT OF BOVINES

J. M. CURRIE, Rome, N. Y.

The presence of foreign bodies in the digestive tract of the bovine family occurs more frequently than I at one time supposed. It is a well known fact that animals of this class are careless about their eating; masticating coarsely and swallowing rapidly all food. They often swallow nails, sack needles, pieces of wire, cor-set steels, fence staples, pieces of wood, bone, etc. If these objects pass through the oesophagus and reach the stomach and remain there, they do not as a rule seem to do any harm, but if by chance they should pass on and enter the intestines, they are apt to become intercepted, in making the curves, the point becoming imbedded in the mucous membrane and by pressure from behind and the natural muscular action of the intestine, they puncture the walls and enter the abdominal cavity, and if the object be a common nail the head will prevent it from passing entirely free from the intestine, then the trouble begins. Perhaps a small amount of ingesta may pass with it and by the action of the intestine wafting it to and fro an acute peritonitis sets in causing death. Post-mortem reveals the above mentioned inflammation with considerable serous fluid and some coagulum; the foreign body is readily recognizable.

The most common course in my experience has been for these objects to puncture the wall of the reticulum and travel through the diaphragm toward the heart, causing pericarditis and death in a few days; but I have known a case to linger two weeks from the time the first symptoms developed.

In an ordinary case the cow stops eating and from her general appearance might be suspected of having indigestion. She looks full over the region of the rumen; refuses to eat or drink; rumination ceases, etc.

A cathartic is now administered followed by whatever line of treatment is deemed most advisable. In a couple of days she will

very likely show an inclination to eat a little. There is some encouragement but improvement is of short duration. The early symptoms return with some additional ones: such as hurried breathing; sometimes elevation of temperature; a distressing grunt, which is modified by standing the animal with her forward feet six or eight inches higher than the hind ones and intensified by standing in the opposite position; anxious expression of eye; not much evacuation from the bowels, etc. Auscultation reveals a condition similar to hydro-thorax but more localized over the heart region. At about this time an edematous swelling will appear in the submaxillary space gradually increasing in size and extending down to the inferior cervical region, sometimes as far back as the posterior part of the sternum to the abdomen. At about this time all symptoms intensify and death soon follows.

Autopsy usually reveals all organs in the abdominal cavity normal, but from the diaphragm anteriorly there seems to be a line of indurated new tissue extending to the pericardium, which is often much distended. Upon opening the same a large amount of foul smelling serum, pus and coagulum escapes. The heart itself looks like a misshaped mass of granulating tissue of a whitish-yellow color. Usually one of the above mentioned sharp objects is found in close proximity to the heart.

Another condition which I have witnessed was the puncture by a piece of copper wire four inches long through the mucous membrane of the rumen imbedding itself between that and the muscular walls, causing an abscess as large as a man's head, revealed on post-mortem.

If these cases could be correctly diagnosed early, slaughter of the animal should be advised and the carcass passed for food.

Along the line of an early diagnosis I am in hopes that some genius with an inventive turn of mind may perfect an apparatus of the X-ray order, which will be reasonable in price, practical and applicable to viewing the innermost recesses of animals as large as an ordinary cow, so that we might early advise our client of existing conditions and that the animal might be disposed of in such a manner that practically no loss might occur.

A post-mortem should be held whenever opportunity presents itself. Many unsuspected conditions are revealed which otherwise would remain veiled in mystery. In the last three years I have found the objects above mentioned in as many as fifteen cases, of which I could not have been positive without so doing.

PUNCTURE OF ABDOMINAL CAVITY

T. O. BRANDENBURG, Lakota, N. D.

Large Clydesdale mare, heavy in foal, age about eight years and used on one of our North Dakota farms as work animal and brood mare.

A fork was accidentally left in her stall one night and in the morning the owner discovered it run in the full length of the tines (about 10 inches.)

I was called at once and found the following condition: the fork had been removed and examination showed the fork as entering the abdomen below the twelfth rib right side and running directly inward and slightly posteriorly. The mare was in a very excitable condition and showed considerable pain, serum dripping from two of the openings, pulse 65 and respirations shallow and rapid, the fetus was jumping about a great deal but it was impossible to determine whether the uterus had been punctured. From the location it appeared probable.

Treatment:—Sedative of chloral hydrate, one ounce. Polyvalent bacterin.

Five days later examination showed a temperature of 104.5 and pulse 70. Polyvalent bacterin in double dose. Five days later animal was in nearly normal condition as to pulse and temperature and about two months later gave birth to a very nice colt but suffered with retained placenta.

The mare has showed no effects of the accident, except occasional slight pain from adhesions.

DROPSICAL UTERUS AND RACHITIS OF FETUS

T. O. BRANDENBURG, Lakota, N. D.

Grade Shorthorn cow, four years old and a splendid milk animal. During the previous winter months she had been fed very coarse feed, consisting mostly of straw and a little grain and had during that period become rather emaciated. However, due to the rich spring pastures, she had gained in flesh and the abdomen had become enormously distended for a month previous to calving and had gradually enlarged as parturition time neared.

Labor, accompanied by a great flow of very thick gelatinous fluid slightly solidifying when exposed to air and of a peculiar odor, (estimate of 20 gallons.)

Examination showed an emaciated fetus, posterior presentation, lateral position, all limbs flexed and all joints enlarged and ankylosed.

Delivery was accomplished by breaking the hind limbs in tarsus and pelvis. This was easily done as the bones were very brittle and broke easily in the epiphysis.

Calf weighed about 75 pounds, all joints ankylosed, lateral and posterior curvature of the spine and lateral curvature of the neck.

The cow made an uneventful recovery.

Diagnosis:—Rachitis of the fetus and dropsical condition of the uterus.

HYDROCELE IN A YEARLING BULL

R. S. HEER, Platteville, Wis.

One of the most interesting cases that came to my attention during the past year was that of a pure-bred Guernsey bull owned by Charles Wilkins. First inspection revealed a very large hydrocele of the left scrotal sac, the scrotum extending below the hocks. After making a careful examination, I concluded that aspiration of the fluid would be the proper procedure, so I disinfected the skin of the scrotum and introduced a horse trocar and canula. A large quantity of bloody fluid was withdrawn. Following the aspiration, I injected a 25 per cent solution of fluid extract of thuja.

Ten days later I was called again and found the scrotum as large as ever, but a great deal harder. I again introduced a trocar, but this time the contents of the scrotum were so thick and flaky that only a small amount came away through the canula. I then made an incision large enough to admit one finger and found the entire left scrotal sac lined with a tough membrane about an inch in thickness. A large quantity of a thick flaky fluid resembling the contents of a neglected hygroma of the withers was present. I enlarged the scrotal incision, so that it would admit my hand, and then proceeded to remove the mass of tissue, which seemed to be of a fibrous nature. After all the diseased tissue had

been removed, the scrotum was flushed with Lugol's solution, then packed with sterile gauze, which was left in for twenty-four hours.

The subsequent treatment consisted of a daily flushing with a 1:2000 bichloride solution. In four weeks the scrotal wound was healed. At the end of that time the scrotum had regained its normal size and shape.

Eight months later the Wilkins herd was tuberculin tested and this bull reacted to the test. I am inclined to believe that the hydrocele was due to tuberculosis of the testicle, or its appendages.

—*Proceed. Wis. Vet. Med. Ass'n.*

STRICTURE OF THE ESOPHAGUS

L. A. WRIGHT, Columbus, Wis.

Some time in November we were called to see a two-year-old colt that had received a peculiar injury. The farmer was breaking the colt to halter when he threw himself backward against the sharp end of a board on a broken partition. It caught him in the region of the throat, severing the jugular vein and evidently injuring the esophagus. The vein was picked up and ligated and the wound healed nicely and all went along fine for about a month, when we were again called to relieve him this time of a choke. We failed in our attempts at the farm, so had him brought to the hospital. It was decided that there was a stricture of the esophagus and that an operation would be necessary. The stricture was so complete that it would not admit the passage of an ordinary horse catheter down the gullet. We cut down upon the esophagus and found a heavy band of cicatricial tissue encircling it. This band was divided in several places and then it was possible to pass a stomach tube and later an ordinary probang. The colt was able to drink liquids but unable to swallow any solid foods. Just at this time the owner decided that he did not care to go to any more trouble and expense, with so little prospect of a complete recovery, so we destroyed the animal.—*Proceed. Wis. Vet. Med. Ass'n.*

CONGENITAL LUXATION OF THE RADIO-ULNAR-HUMERAL JOINT.

E. A. WESTON, B.V.Sc., University of Western Australia.

The pup walked in the position shown in the picture, with the leg from the elbow downwards on the ground. The external condyle of the humerus rested on the internal glenoid cavity of the radius and the external cavity was displaced outwardly. The beak of



the olecranon process of the ulna rested on the depression on the outside of the humerus from which the external lateral ligament arises. The bone was thus rotated outwards and the joint immobile. The condition was not diagnosed during life, the impression given on examination being that of ankylosis with bony exostoses.

The State Veterinary Medical Association of South Dakota held its meeting in July at Mitchell, S. D. The association took action towards prosecuting illegal practitioners. A clinic was also held. The association was organized last winter at Huron as an outgrowth from the old association. About 60 veterinarians were in attendance. The officers are as follows: President, Dr. John L. Barber of Tyndall; Secretary, Dr. C. R. Andrew of Huron; Treasurer, Dr. O. C. Shepard of Centerville.

The Minnesota State Veterinary Medical Association at its meeting in Minneapolis passed a resolution recommending that the Board of Regents appoint a "Veterinary pathologist" "who will direct the work of the division, especially along the lines of research with animal diseases."

ABSTRACTS FROM RECENT LITERATURE

MILK FEVER FOUR MONTHS AFTER CALVING. R. W. Knowles, M.R.C.V.S. *Veterinary Record*.—This case is recorded because of the unusual length of time elapsed since parturition had taken place. The cow had calved some four months since when she was taken ill. Down, unable to rise, cerebral symptoms, champing of the mouth, and flow of saliva, suggested to the writer that the case was one of simple hysteria, for which he prescribed sulphate of magnesia and chloral hydrate. The next day the animal was worse: helpless, unconscious, moaning, lower jaw dropping, in fact, typical manifestations of milk fever. The regular inflation udder treatment was immediately applied, with the application of cold compresses to the head. Four hours after the cow was up, and has been well ever since.

LIAUTARD.

GREEN DISCOLORATION OF THE BONES OF A SHEEP. E. Messner. *Deutsche Tierärztliche Wochenschrift*, Vol. 23, pp. 389-390, 1915. A butcher found a sheep in which all the bones were colored green. The bones and adherent meat were of the size, odor, shape, etc., normal to sheep. On longitudinal and cross section, the radius was green throughout the innermost layer of the compact bone substance. In spots the coloration extended to the spongy substance. The colored layer was on the average, 1 mm. thick. In the distal half of the femur the green coloration was found as a layer, 1 mm. thick, under the inner surface of the compact substance. On cross section of the femur, the layer appeared as a ring.

Jaundice was absent. The meat inspectors examined and passed the carcass.

Microscopic examination of thin bone sections taken from the colored areas showed a diffuse distribution of the coloring matter; a granular deposition of the coloring matter was not noted, although looked for.

The green color was soluble in hydrochloric acid. Chemical tests showed that the color was due to iron. Fresh, normal sheep bones when similarly extracted with hydrochloric acid gave no stronger tests for iron than the acid itself.

On searching the literature nothing similar to the above condition was found. Beel (*Zeitschrift f. Fleisch und Milch Hygiene*, Vol. 12, p. 350, 1902) described a green discoloration of the fatty

tissue and underlying muscle, located at that part of the body which comes in contact with the ground when the animals lie down. The coloring was green, but located differently and probably of a different nature.

BERG.

MILK FEVER(?) H. Walpole, M.R.C.V.S. *Veterinary Record*. Some three or four years ago, writes the author, a small half-bred North Country ewe was the last one of a small flock to lamb. She did it in the pasture where the grass was not rich. After lambing she was taken with the others and put in an orchard full of rich succulent grass. Within twelve hours after she had been there, she was found insensible on her side in a ditch and showing all the symptoms of milk fever: eyes amaurotic, stertorous breathing and complete insensibility. The udder was inflated with a small syphon and pump. Within one hour, she was on her legs and in an hour or so after showed no symptoms that anything had been wrong.

LIAUTARD.

THE FATE OF TWINS IN THE UTERUS OF THE COW. G. Giovannoli. *Schweizer Archiv für Tierheilkunde*, Vol. 57, pp. 520-524, 1915.—Occasionally both fetuses (twins) enter the pelvic inlet at the same time. A cow, after laboring 10 hours, was unable to pass the fetus although powerful traction was applied to the forelimbs. On careful examination I found that the forelimbs belonged, not to one calf, but to two.

I then located both forelimbs of one calf and roped them and traction was applied. I repelled the other calf at the same time with my hand. The first calf was easily brought out, soon followed by the second.

Generally the birth of one calf serves as a stimulus to the birth of the twin, but this is not always the case, as is shown by the following: A cow threw a normal calf and the fetal membranes were passed normally. Two days later the same cow threw a second normal calf.

What happens when one or both twins die *in utero* depends upon a large number of factors. The results cannot be predicted. Following is an interesting case: A 6 months pregnant cow came into milk. At the end of the normal gestation period the cow threw two calf mummies as large as cats. The fetal membranes were moist, intact and firmly attached to the fetuses. The cow

came into heat again at her regular time. The following case shows that the birth of one twin does not stimulate the birth of the other: On July 5, a cow expelled a very small dead fetus, it was as large as a mouse and enclosed in a sac of fluid. The cow was normal in general behavior and condition, udder slightly swelled and contained some milk; but the cow was not milked. In this case, as in the previous one, the expulsion of the dead fetus was coincident with the onset of estrum. On November 14, the same cow threw a perfectly normal, vigorous calf, much to the astonishment of the owner who believed the cow to be non-pregnant.

BERG.

PERITONITIS AND TRAUMATIC PERICARDITIS IN THE CAMEL. Hermanes Gibson. *Veterinary Record*.—A camel was reported dead. He was a five year old animal in good condition. The post-mortem is here revealed: carcass distended, considerable, claret colored, fluid escaped from the abdominal cavity when it was opened. The stomach was filled with ingesta. The liver showed fatty degeneration. Spleen, kidneys and bladder apparently normal. Congealed material was noticed near the esophageal entrance to the rumen, traced through the diaphragm to the pericardium, which contained one pint of claret colored fluid similar to that of the abdominal cavity. The condition pointed to the action of a small foreign body, a wire nail perforating the auricle, which had been picked up in the food by the camel.

LIAUTARD.

TUMOR IN THE PELVIC CAVITY OF A HORSE. Contribution to the Operative Treatment of Colic. Dr. Dornis. *Zeitschrift für Veterinärkunde*, Vol. 27, pp. 325-326, 1916.—A horse (gelding) suffered from chronic colic. The symptoms were somewhat variable and consisted of unrest, expressions of pain, and straining on the rectum, which caused the protrusion of a deep-seated swelling-visible on the left of the anus and near it. A similar picture was noticed, to a lesser degree, during the preceding 8 days and in all probability had existed unnoticed before that. Rectal examination disclosed a tumor in the pelvic cavity, estimated to be as large as a child's head. The pelvic part (Beckenstück) of the small colon was pressed together toward the right by the tumor.

Soon after the patient was admitted to the veterinary hospital the colic began anew and assumed such grave form as to indicate the necessity of immediate operation,

The horse was laid on his right side and chloroformed. In the furrow between the anus and the left tuber ischii an incision was made, 25 cm. long through the skin and underlying muscles (semi-membranosus and semi-tendinosus). Meanwhile an assistant pressed the tumor backwards, working with his hand in the rectum. A yellowish tumor was protruded. It was grasped with a large Billroth forceps and detached from the adjacent tissues. This was a comparatively simple operation, as the tumor had a smooth surface and was attached by loose connective tissue. In many places the separation was possible by blunt dissection. There was little hemorrhage. This made possible the complete removal of the tumor which extended anteriorly to the abdominal wall; it was limited on the left by the pelvic wall and on the right by the rectum which it surrounded dorsally and ventrally.

Shortly after the operation the horse defecated freely and without pain. He made a complete recovery and never showed symptoms of colic.

The tumor was unexpectedly large. During the operation it became apparent that the clinically estimated size of the tumor fell far short of the actual fact: the tumor weighed 4450 g. (9 pounds). Histological examination showed it to be a fibrosarcoma. It had the consistence of relaxed muscle.

BERG.

PULMONARY TUBERCULOSIS IN A CANADIAN HORSE. Veterinary Major Bringard. *Rec. de Med. Vet.*—Arrived from Canada, this horse entered the hospital on account of great debility from the ocean trip, and with pulmonary complications of distemper. His recovery was slow and incomplete. He soon gave full manifestations of chronic pulmonary and pleuritic lesions. Suspected of possible latent glanders, he was malleined on three occasions but always with negative results. He died in an extreme cachetic condition. At the post-mortem, no lesions of glanders were found. But in the thoracic cavity there were found old lesions on the pleura and in both lungs were numerous centers of imperfectly recovered lobular pneumonia were detected. These were principally in the anterior lobes with numerous grayish, homogeneous tubercles, without centers of caseation or softening. The bronchial lymphatic glands were very large and contained numerous yellow-grayish granulations. The bacteriologic examination of the lesions revealed the presence of the bacilli of Koch. Guinea pigs inocu-

lated with products from the lungs died in a few days and presented also the same bacilli at the microscopic examination.

LIAUTARD.

FRACTURE OF THE OLECRANON PROCESS OF THE ULNA. J. FOX. M.R.C.V.S. *Veterinary Record*.—Case handsomely illustrated by a double inside and outside view of the fracture resulting in a six year old, well bred draught gelding, from a kick received during the night. There were small wounds on the outside of the fore arm and no lameness. The animal was put to work as usual but the next day he was very lame. At rest, the horse stood squarely on all four and apparently in no pain. In moving the affected leg was carried well. On manipulating, very little could be noticed and it was only on minute examination of the point of the elbow that the diagnosis was made with extreme difficulty for detection of the crepitation. The olecranon process at the post-mortem was found fractured into five fragments. LIAUTARD.

EPIDEMIOLOGY OF EQUINE INFLUENZA. (Pink Eye, Brustseuche). Dr. Macek. *Wiener Tierärztliche Monatsschrift*, Vol. 2, pp. 553-567, 1915.—In their recent investigations of equine influenza, Gaffky and Lühns summarize their results as follows:

1. The transmission of influenza ordinarily takes place from horse to horse, without an intermediate carrier.
2. The incubation period is at least 16 days, in most cases between 20 and 40 days, and more than this in a few cases.
3. The inflammatory alterations begin in the finest alveoli in the lungs and may spread through the lung to the pleura.
4. About the fourth or fifth day of the disease, other bacteria, (streptococci) may invade the inflamed lung areas and cause necrosis.
5. The disease is not transmissible to healthy horses by inoculations from blood or organs of diseased horses. But the transmission may be made, though not always successfully by inoculating the bronchial secretions in the nasal cavity of a susceptible animal, without any trauma whatsoever.
6. In the ciliated epithelial cells found in the plentiful bronchial secretions of diseased animals, structures are noticed which may represent degeneration processes; and probably are not parasites. The authors believe, however, that parasites were found in other cells throughout the respiratory tract.

According to these authors, the causative agent of influenza localizes in the epithelium of the finer bronchi and alveoli without entering the general circulation. There the agent develops a toxin which causes influenza.

The following observations were made during an epidemic of influenza in 1913-14, and are of interest because they were made under natural conditions. There were 380 horses of which 76 were affected with typical equine influenza (Brustseuche).

1. The incubation stage in influenza is by far longer than has been supposed. In working horses it is from 3 to 4 weeks, while in resting horses twice this period may elapse before the outbreak of visible signs of the disease. This may account for outbreaks caused by bringing horses, quarantined for 4 weeks, into contact with healthy horses. Generally, during a 4 weeks quarantine, the disease will make itself manifest.

2. An infected horse can infect another horse not alone when distinct clinical symptoms of influenza are present, but also in the incubative stage, when it is apparently in good health and especially in the last few days preceding the outbreak of the disease.

3. The spread of influenza may be checked with certainty if the first cases are promptly isolated, thus preventing contact between infected and non-infected horses; the isolation stall need not be far from the others. It may be among them, just so long as healthy animals are not exposed by contact.

4. Influenza is transmitted mainly from horse to horse. In this connection the intermediate carriers play an unimportant role (i. e., the stall, people, dirt, straw, feed, rats, mice, sparrows, blankets, harness, pails, etc) Apparently, the causative agent of influenza soon dies outside of the body of the horse.

5. The spread of influenza from place to place is to be explained according to the previously made observations, i. e., that horses having a long incubation period transmitted the infection to other horses with which they had come in contact.

6. Reconvalescent, symptomatically treated horses should not be permitted to come in contact with healthy ones, until 4 weeks after fever has subsided. On the other hand, in animals that have received neosalvarsan injections, fever subsides in 36 to 48 hours after injection and 8 days after this subsidence of fever, the animals may be released.

Generally a single dose of 4.5 g. neosalvarsan was sufficient to reduce the fever in 24 to 36 hours.

BERG.

THE SIGNIFICANCE OF CERTAIN NATURAL FLAGELLATES OF INSECTS IN THE EVOLUTION OF DISEASE IN VERTEBRATES. H. B. Fantham and Annie Porter. *Journ. Parasitol.*, June, 1916, V. 2, No. 4, pp. 149-166.—In this paper the authors have summarized the work so far accomplished in showing the relation of the flagellates parasitic in insects to the flagellates parasitic in vertebrates. The very interesting fact has been demonstrated by a number of workers that many of the flagellates which are insect parasites, especially flagellates of the genus *Herpetomonas* and *Crithidia*, may be introduced into vertebrates, either by feeding the parasitized insects to the vertebrates or by subcutaneous or intra-peritoneal inoculation, and that these flagellates will develop and multiply in the new host and exert pathogenic effects. Thus Laveran and Franchini have infected dogs with flagellates from dog fleas, and have infected rats and mice with flagellates from the fleas occurring on these animals. Fantham and Porter publish a rather extensive list of experiments where they have introduced various herpetomonads of insects into different vertebrates and produced conditions resembling leishmaniasis or kala-azar.

The authors believe that the various herpetomoniasis, including the leishmaniasis, in vertebrates are the result of the introduction of the flagellates of insects or other invertebrates. The pathogenicity of these forms is explained on the basis that "The newer a parasite is to the animal harboring it, the less it is in harmony with its environment. The consequence is that its discord with the host is manifested by pathogenic effects and the latter animal succumbs. Chronic maladies are usually correlated with greater powers of adaptation of the parasite to its host, with the period that has elapsed since the original introduction of the parasite to the host, and with the relative resisting powers of the host to the specific action of the parasite."

Thus certain trypanosomes appear to have developed from the flagellates of certain insects (as *Drosophila*), and these insect parasites in turn appear to have developed from free-living forms, the flagellate becoming increasingly pathogenic in its evolution from a free-living form to one parasitic in vertebrates. The writers believe that the malarial parasites represent a similar development from a coccidian.

In the writers' experiments the inoculation of insect flagellates into vertebrates resulted in an active multiplication of the

parasite, giving rise to diseases running an acute or chronic course. Natural infestation of vertebrates with herpetomonads which were apparently from invertebrate sources is also known. The evidence is complete, according to Fantham and Porter, that the important group of diseases known as leishmaniasis are really invertebrate-borne herpetomoniasis, the parasites having evolved from flagellates of invertebrates.

This is a very interesting collateral development of the tremendously important subject of arthropod transmission of disease, and suggests the need of prophylaxis directed against arthropods as transmitters of pathogenic protozoa which are just becoming parasitic in vertebrates.

M. C. HALL.

GLANDERS DIMINISHING IN NEW YORK CITY. The administrative measures enforced by the Department of Health embrace the sanitary control of all stables in the city, the closing of public horse troughs, the making of specific diagnostic tests for glanders of all horses exposed to a proved case of glanders, the destruction of all reacting animals, the supervision of all horse-shoeing establishments, and the distribution of circulars of information on glanders to all horse owners, stable keepers, horse shoers, etc.

CASES OF GLANDERS IN NEW YORK CITY

	1914	1915	1916
First quarter.....	229	232	127
Second quarter.....	313	161	82
Third quarter.....	227	145	—
Fourth quarter.....	384	166	—
Totals.....	1,153	704	209

In an article on Municipal Abattoirs—A Community Necessity, by Alex. Grouchy, Jr., Mayor of Baton Rouge, La., the following statement is made: "The municipal abattoir of Baton Rouge, is a monument to the constant, earnest, intelligent recommendations of Dr. W. H. Dalrymple of the Louisiana State University, strongly seconded by Dr. Oscar Dowling, President of the Louisiana State Board of Health, and represents a giant step forward in matters of health regulations."

ASSOCIATION MEETINGS

AMERICAN VETERINARY MEDICAL ASSOCIATION

ADDRESS OF WELCOME

JAMES H. LEE, Detroit, Mich.

Mr. Chairman and Ladies and Gentlemen of the fifty-third Annual Convention of the American Veterinary Medical Association: It is a pleasant duty this warm morning, perhaps the warmest we have had in Detroit this summer, to extend to you a welcome on behalf of the Mayor of the City of Detroit. Mayor Oscar B. Marx is at the present time very busy, and it was an absolute impossibility at ten o'clock this morning for him to make arrangements to be here and welcome you in person, as he very earnestly desired to do. So he requested me to come here and in his behalf extend to you ladies and gentlemen who are entering upon this five-day convention in our city, a welcome.

In respect to the profession which you gentlemen represent, we here in Detroit through Dr. H. E. States, the veterinarian connected with the Board of Health of Detroit, have done much work along the line of conserving the public health through the veterinary profession. We are helped a great deal in this respect by the twelve government inspectors who work in conjunction with the Detroit Board of Health. My attention has been called by Dr. Patterson, a local veterinarian of very high repute, to the fact that the horse doctor of olden days has been relegated to the past; that the man who could go out and practise your profession without a scientific education, without a state examination, and a diploma, has gone the way of the old time lawyer who could be admitted to the bar upon motion.

It was my privilege about five years ago as a member of the state senate, to go into some of the laws governing your profession. I did that in conjunction with an effort to pass a bill relative to raising the standard of the legal profession by making it compulsory that candidates for admission to the bar in the state of Michigan pass a bar examination. At that time I found that every profession with the exception of the profession of the law, required that a man have a scientific education, that he pursue a certain course in his chosen profession in a standard school, and that he then take an examination. I was agreeably surprised to find,

at the time, because I had the prevailing idea that the veterinarian was simply a horse doctor, I say I was agreeably surprised, ladies and gentlemen, to find that the standard here in Michigan for admission to this profession is very high; that a man must have a college course in this work of, I believe, four years, and must then take an examination before a state board before being admitted to practice. It speaks well for the growth in popular estimation, and for the growth in professional standing, that this profession has attained.

To digress a minute to the City of Detroit, of course without saying it, you all know we have the most beautiful city in the world. Anent my being here this morning, I want to tell you a story. It used to be the custom of the municipality to have upon the city hall a large electric sign, reading "Welcome". That was stationary, stood there throughout the summer months and then underneath it, we would put the names of the various conventions that were meeting in the city; but conventions got to be so numerous, and so many came here simultaneously, that a little jealousy sprang up, and if we would say, Welcome to the Veterinarians of the World and the physicians happened to be here in session at the same time, you can see there would be jealousy. We found it impossible, having only one sign, to accommodate all conventions; and we then came to the conclusion that hot air was cheaper than electricity and could be more easily dispensed, and so we now come around to welcome you in person.

I want to have you ladies and gentlemen get around our beautiful city. I want also to extend to you a cordial invitation to come and meet his Honor, the Mayor. He wants you to call upon him, if you have an opportunity, either individually or in a body at the city hall—which is quite centrally located, just a block or two east—before you go away, so that he may shake your hands, and extend to you a welcome in person.

In closing I simply want to say that we give to you the full freedom of our city. We want you to have a good time. We want you to see some of the wonderful industries that we have here. We do not want you to forget that we are not only the greatest automobile city, but that we have the largest pharmaceutical works in the world. We want you to remember that we have the largest stove works in the world. We want you to remember that we have some of the finest boulevards. We want you to remember that we have some excellent water trips.

We want you to take in everything you can and enjoy yourselves, and when you go away you will say indeed our motto was a true one, that, "Detroit is a place where life is worth living." Ladies and gentlemen, I thank you.

RESPONSE TO THE ADDRESS OF WELCOME

TAIT S. BUTLER, Memphis, Tenn.

Mr. President, Mr. Lee and Ladies and Gentlemen: Since arriving in the city, or rather since leaving St. Louis yesterday morning, I have been trying to figure out this anomaly, this hot air proposition that Detroit is furnishing us; and I am glad that our friend, Mr. Lee, has stated the explanation. Certainly you will agree with me that it is sufficiently hot. I was interested in knowing the reason of that hot air, and we have just been told that Detroit has the largest stove factory in America here. I think they must all be at work. That statement may seem rather strange to you, as I come from the south, where we think it is hot, but we are not going to enter into any competition with Detroit along that line.

It is peculiarly fitting, it seems to me, that the American Veterinary Medical Association should meet in Detroit. We have heard repeatedly that the object and chief concern of our business was going out; and that Detroit was playing the chief role in putting the faithful horse out of business. This, my friends, is the answer of the American Veterinary Medical Association to all those false claims. Today there are more horses at work for man than ever before in the history of the world. Some of them, true, are working to his destruction, but by far the larger number are working for man's betterment. And this magnificent profession, splendid in its attainments, has progressed steadily for the protection and the development of the faithful friends of man, the live stock on the farm.

It seems to us that the future of the American Veterinarian is particularly bright. Perhaps it does not occur to you that of all the means of economically maintaining soil fertility—and by the way, the American acre only produces about one-half as much as the European acre—it is a fact, however, that among all the other means of building up and maintaining soil fertility economically,

that live stock has become recognized by all the authorities as one of the chief agents. Therefore, instead of having a small number of animals in this country per capita, the time is not far distant, certainly the time is coming when the number of domesticated animals in America will be doubled and trebled, they must be quadrupled, in proportion to the per capita, to what they are now, and the American veterinarian must profit in the same measure by the increase.

I am a substitute this morning, my friends, as was the gentleman who made the address of welcome. I have not the ability to express to Mr. Lee the appreciation of our welcome to Detroit. We have been here before. Sixteen years ago we were in this city. I remember it particularly for good and sufficient reasons. I am sure everyone who was here on that occasion has not failed, during all these past sixteen years to have in his heart a warm place for the veterinarians and the people of Detroit.

I wish to assure you, Mr. Lee, that we accept your kind welcome in the spirit in which it is given; and we feel confident, from past experience, that we shall have a splendid time in the city of Detroit; because as you have so truly said there is not a more beautiful city on this American continent. Long' before I had ever seen Detroit I had heard of its beautiful streets, its splendid boulevards, its magnificent buildings, and when I came here I was not disappointed. I had not conceived that there was an American city so clean, so well built, so beautifully located with such picturesque parks and highways. Therefore we feel certain we are going to have a splendid time in this city of Detroit at this fifty-third meeting of the American Veterinary Medical Association; and I wish to thank you on behalf of my colleagues and the ladies and gentlemen here assembled, for your splendid address of welcome.

ADDRESS OF THE PRESIDENT OF THE A. V. M. A.

R. A. ARCHIBALD, Oakland, Cal.

Fellow Members of the American Veterinary Medical Association
and Friends:

By reason of the high honor you conferred upon me a year ago, I am privileged to follow the time-honored custom established by my distinguished predecessors of addressing you this morning.

Before proceeding, however, I desire to take advantage of this opportunity in attempting to express my heart-felt appreciation for the great honor conferred in being elected to the office of President of the largest veterinary association in the world. I am keenly conscious of the fact that this honor was not bestowed upon me because of any intrinsic merit I might possess, but rather I desire the privilege of considering it a well deserved recognition of the yeomanry service in the work of upbuilding the veterinary profession in North America by the veterinarians of the Pacific Coast, particularly those of California.

California, even though somewhat isolated by location in the far west, has for the past few years ranked among the first two or three states in point of membership in this association. This should be looked upon as remarkable, and more credit is due when we consider the veterinary population of the State of California as compared with the veterinary population of such states as New York, Pennsylvania, Illinois, Iowa, Ohio, and others. As this condition of affairs cannot be ascribed to accident, it demonstrates that the work of organization along veterinary lines in California has been prosecuted unceasingly for the past twenty-five years.

From an analysis of the work accomplished by this association during the past twelve months, the following achievements stand out most prominently:—The acquiring of an official scientific Journal for this organization has been for many years a crying necessity and that this administration has been able to purchase the *American Veterinary Review* and successfully finance and edit the same for the past year as its own publication in the face of innumerable difficulties, must be considered gratifying in the extreme. When it is realized that in previous years this association was frequently in such financial straits as to make it necessary to borrow money in order to meet its obligations, makes this achievement still more impressive. We believe nothing has been done in recent years that will do more towards concentrating and cementing the interests of the veterinary profession in this country than the continued successful publication of this heretofore much needed veterinary literature.

As you all know, our efforts to obtain legislation for the army veterinarian has been finally brought to a successful termination, and while this administration desires as much credit as possible for the consummation of this desired recognition of our profession,

we do not wish in any way to undervalue the work of those who for years have untiringly waged a campaign to obtain this recognition for our army veterinarian. We realize very forcibly that many of our members have toiled faithfully for years to lay a foundation for this legislation and perhaps we have been undeservedly fortunate in being able to step in at the psychological moment and reap the reward for our army confreres that has long been their due.

While considering legislative matters we must not overlook the fact that a campaign is being waged to provide legislation whereby proper classification of employees of the Bureau of Animal Industry may be legalized and we sincerely hope and trust that the so-called "Lobeck Bill" will meet with a success similar to that of the army bill.

While we in the far West have only vague ideas of the intricacies of the sanitary and police problems which arose incidental to the late outbreak of foot-and-mouth disease in the east and middle west, we do believe we are sufficiently alive to the situation to unqualifiedly commend the work of our Bureau of Animal Industry whose destinies are watched over by our Drs. Melvin, Mohler, and an efficient corps of trained veterinarians, for the splendid manner in which it assumed the work of control and eradication. As a result of the firm stand adopted in the handling of this disease, the results accomplished by our Bureau will go down in the archives of veterinary history as one of the remarkable scientific achievements of all time.

While great credit is due the federal authorities in this connection, we must not overlook the splendid work performed by members of the profession occupying semi-official or perhaps unofficial positions. With few exceptions these men when called upon to assist at great personal and business sacrifices contributed their time and energy with only one objective viewpoint: viz, the eradication of apthous fever from this country.

Regarding the control of tuberculosis, it is quite apparent that we can only report progress at this time. It is hoped, however, that the International Commission on Bovine Tuberculosis will submit at this meeting data and advice that will tend to guide our footsteps over the many obstacles this problem presents, as it has done on several occasions in the past.

Hog cholera is another disease that should receive more study and consideration. We trust that some action will be taken during

this meeting towards laying a foundation for the control and use of anti-hog-cholera serum and virus, particularly virus. It has undoubtedly been shown in some states where the use of these biologics is properly controlled, that the most encouraging results have been obtained, whereas in communities where their use has been placed in the hands of the laity and other scientifically irresponsible individuals, the results have been disastrous, detracting as a result from the confidence that should and would be placed in these prophylactic agents if they were properly applied.

Little need be said with reference to the next most important disease, namely, contagious abortion. The program committee has arranged for a symposium upon this vital question and there is no doubt but that the ground will be thoroughly covered both by scientific papers and discussions.

Only passing mention of the above named disease is made, as it is realized that the various committees appointed for the specific purpose of considering the same will deal with them at such length and in such a manner as could not possibly be attempted in an address of this character.

A matter that is dear to our heart and which is considered pertinent to an address of this nature is the tremendous progress being made in the solving of problems underlying the question of immunity. As probably you all know the theories of Metchnikoff, Ehrlich and others, while they have served as stimulants and have laid a foundation for research and study, later developments have shown that such theories have failed to furnish logical explanations for the changes an animal undergoes during the progress of an infectious or toxemic disease. The work of Vaughn, Peterson, Wright, Jobling, Abderhalden, Bordet, Friedberger and many others have shown that the theory of phagocytosis of Matchinkoff and the side chain theory of Ehrlich have not been entirely satisfactory, and as a consequence they will have to undergo modification or even give way to the newer theories which deal with the physio-biological factors designated as ferments and antiferments. These elements are attracting the attention of physiologists, biologists and pathologists almost to the exclusion of all the hypothetical factors heretofore considered. The fact has already been established that normal balancing of these elements has a vital bearing on normal metabolism and that the therapeutics of the future will be largely confined to an attempt to regulate the normal balanced

relationship between these elements. In other words it becomes more and more apparent that upsetting this balanced relationship is the main factor in bringing about pathological conditions, and in controlling pathological conditions, the big problem confronting the medical world to day is how to rationally maintain the normal balance between the ferments on the one hand and the antiferments on the other by increasing or decreasing either as the occasion requires. The action of these ferments and antiferments, as research has shown, is not necessarily specific in character, hence, while specific reactions and changes are not denied, they are not the only factors involved in the process of immunity.

The lesson to be learned here is that those of us who have been pinning our faith on specific therapy in the treatment and control of infectious diseases and relying upon the doctrine of specificity to explain the changes occurring during the progress of acquiring immunity and in our study of immunology, must prepare ourselves to accept and to understand the principles involved in the newer ideas gained from actual experimental research and clinical application of the knowledge acquired by a study of the role played by the physio-biological elements known as ferments and antiferments.

The man who endeavors to keep up with the progress of scientific medicine of today has his work cut out for him, and in order to keep pace with modern progress, he must be endowed with extraordinary energy, in fact must be of an exceptional character and be fortified with a mentality that is capable of being stimulated by association and contact with those who are interested and are working along similar lines. No man who is devoting his life to the work, study, and elucidation of the many questions concerning the control and eradication of disease can hope to make progress along these lines unless he mingles with his fellow-men whose mission and life work is devoted to the solving of these problems.

Our main object in calling attention to these facts is to endeavor to show that the big problem of the man who is working along scientific lines today, even though he may be engaged in constructive work himself, is to keep abreast of the tremendous progress that is being made and to emphasize the fact that he who does not exert every energy he possesses with this object in view, will fall by the wayside or will at least become a nonentity in his community as far as the medical profession is concerned.

If these be the facts, it is quite evident that the veterinarian who desires to be alive to the issues of the day and remain in the march of progress, must take advantage of the facilities afforded by membership in the American Veterinary Medical Association and to use to the fullest extent the meetings of this association as a medium to commune and exchange ideas with his fellow-workers.

Coming down to a consideration of the future as it pertains to the welfare of this organization, the first problem that strikes us most forcibly is that of reorganization. It is self-evident that this association should proceed as rapidly as constitutional practice and parliamentary law will permit to change the present methods of conducting its ultra business affairs which have proven to be entirely inadequate to handle the enormous amount of business that is forced upon us as the result of rapid growth, increased membership and responsibilities. Reorganization of this association therefore, bringing it up to a standard commensurate with its size and future aims and objects, is unquestionably the most vital problem confronting us during this session. If this body should do nothing else during the next few days but reconstruct its constitution and by-laws, rendering them adequate to meet the necessities of such an organization as ours, we will feel when adjournment is reached that we have witnessed the conclusion of the most successful meeting in the history of this association. While we have no doubt that the committee on reorganization will submit a complete report dealing with this problem, we feel that the experiences of the past year have given us some insight as to the inadequacy of our present constitution and by-laws to meet the necessities and particularly the emergencies that crop up from time to time. In this connection therefore, I desire the privilege of submitting to you and to your executive committee, certain recommendations or suggestions.

We believe steps should be taken to interest all state associations in national association work, for if all state organizations became component parts of this association, it would solve the problem of controlling the personnel of our membership and in this way it could be readily determined whether or not a prospective member was or was not an association man and whether he was a man in good standing in his own community.

The custom followed by the American Medical Association of electing its president one year prior to the actual assumption

of the duties of his office should be adopted by this organization as we do not believe, judging from experiences gained during the past year, that any man should be injected into or be required to assume the duties and responsibilities incidental to the office of president without some time for preparation.

Some arrangement should be made to better control the indiscriminate use of the association's money, more especially in the matter of regulating appropriations and controlling the unauthorized contraction of bills by the various committees and resident state secretaries. The finance committee should be properly constituted and be required to pass upon all proposals for appropriations before such proposals are submitted to the association for final action. The committee on finance should also have jurisdiction over all matters pertaining to the finances of the association and should be empowered to employ an expert accountant to examine the books of the association at least once a year. Regarding this would also suggest that all moneys collected in the name of the association be placed in the hands of the treasurer and its use be controlled by the administration at all times.

It appears that the time has arrived when it is absolutely imperative to have a full time secretary elected for a period of not less than five years, whose office should be located where he would be in almost daily contact with the editor of our Journal.

It is essential that a fixed policy be adopted in regard to the matter of dues as it is quite evident that the present chaotic condition of affairs in this connection is, to say the least, deplorable. Your secretary in his annual report will probably have something to say on this question.

Associate members should be provided for as there are many men whose qualifications do not enable them to active membership, but whose support and co-operation would be invaluable from a scientific standpoint.

One of the most pressing needs is the early selection of a business manager for the Journal. At present such duties devolve upon the editor. We think it is the experience of all who are familiar with journalistic work that the functions of editor and business manager have seldom, if ever, been carried on successfully by one person. If this is true, the future success of our Journal necessitates the immediate selection of a business manager, whose mission it will be to take charge of the business features of the publication.

The suggestion is made that all papers and committee reports presented to the association be copyrighted and that only original papers be submitted to this body for consideration or to the Journal for publication.

In view of the tremendous change in the character of veterinary practice, especially in rural districts, conditions that are largely due to the passing of the horse, it would not only seem desirable but in fact especially necessary for this association to take a decided stand in requiring veterinary colleges to supplement regular veterinary instruction with a course on animal husbandry, particularly with reference to the breeding and care of meat and milk producing animals. If this policy is carried out, the veterinarian of the future will be enabled to occupy the position in farming communities that is now indifferently filled by the so-called Farm adviser or agricultural graduate.

The various veterinary educational institutions of this country should also be required to change their curricula so that students could acquire, at least, a fair working knowledge of problems incidental to veterinary sanitary science and police and public health matters in general.

This thought is suggested because in recent meetings called for the purpose of dealing with problems connected with animal husbandry, and sanitary problems incidental to the production of meat and milk, the veterinarian instead of being the leader or a prominent factor in such movements is only present by courtesy or as an invited guest.

The program committee has labored hard to prepare a splendid literary banquet for this meeting and bearing as it does, the names of the men who are constantly doing things, it is hoped that all will take advantage of the occasion presented to obtain all possible benefits therefrom.

This opportunity is taken to express my deep sense of appreciation for the splendid support accorded me during the past year by both officers and members of the various committees and I particularly desire to express my heart-felt appreciation for the support and assistance accorded me by your secretary, Dr. C. M. Haring, who has been untiring in his efforts not only to assist me with counsel and advice in the hour of need, but also for the vast amount of time and energy he has displayed in conducting the

affairs of the association with only one thought in mind, the best interests of the profession we have the honor to represent.

I realize fully that your time is altogether too valuable to be taken up by me in the discussion of generalities so I will close by expressing the hope that this meeting will be a success and will be marked by harmonious deliberation so that our thoughts will not be swayed by personal grievances and desires, but will be centered upon the business at hand for in that way only can the best possible interests of the veterinary profession as a whole and the individual as a unit be conserved and promoted.

REPORT OF THE TREASURER OF THE A. V. M. A.

RECEIPTS FROM OCT. 4th, 1915, to AUGUST 2nd, 1916.

1915		
Oct. 4,	Balance in bank as per report of George R. White, Treasurer, as of August 30th, 1915.....	\$ 1,192.27
Oct. 18,	Received from C. M. Haring, Secretary.....	2,740.60
Dec. 4,	Received from C. M. Haring, Secretary.....	349.00
1916		
Jan. 8,	Received from C. M. Haring, Secretary.....	166.30
Feb. 24,	Received from C. M. Haring, Secretary.....	700.00
	Interest from bank.....	4.59
Mar. 1,	Received from C. M. Haring, Secretary.....	500.00
Mar. 23,	Received from C. M. Haring, Secretary.....	500.00
April 10,	Received from C. M. Haring, Secretary.....	400.00
April 24,	Received from C. M. Haring, Secretary.....	300.00
April 27,	Received from C. M. Haring, Secretary.....	300.00
May 29,	Received from C. M. Haring, Secretary.....	450.00
June 22,	Received from C. M. Haring, Secretary.....	500.00
July 21,	Received from C. M. Haring, Secretary.....	1,000.00
Aug. 2,	Received from C. M. Haring, Secretary.....	1,000.00
Aug. 2,	Interest from bank.....	8.67

Total receipts from Oct. 4, 1915 to Aug. 2, 1916.. \$10,111.43

DISBURSEMENTS FROM OCT. 4, 1915, to AUG. 2, 1916.

1915.		
Oct. 15,	M. H. Reynolds, Expenses College Committee.....	\$ 40.54
Oct. 15,	Dr. Wm. M. Burson, Expenses Resident Secretary, Athens, Ga.	3.00
Oct. 15,	Mrs. Elta L. Paxon, Postage expended by the late H. D. Paxon as Secretary of Illinois.....	2.00
Oct. 15,	N. S. Mayo, On account of salary.....	200.00
Oct. 15,	F. H. Schneider, Postage and printing as Resident Secretary Penna.....	29.00
Oct. 15,	N. S. Mayo, Postage and Incidental expense from May 12, to Aug. 6, 1915.....	71.35
Oct. 15,	Dr. Geo. H. Glover, Expense as chairman of Committee on Advertisement of Veterinary Remedies.....	7.20
Oct. 20,	American Veterinary Review, First installment on purchase of Review, as per contract between Robt. W. Ellis, and Sub-committee (Dr. Eichhorn, Dr. Lyman, Dr. Marshall)	1,000.00

1915.		
Oct.	23, W. Dean Wright, Expense as Resident Sec'y of Oregon	10.95
Oct.	23, Dr. David Fox, Expense as Resident Sec'y of California	23.60
Oct.	23, N. S. Mayo, Expense and incidentals as Secretary, Aug. 9th to Sept. 20, 1915.....	45.71
Oct.	23, N. S. Mayo, Expenses from Chicago, Ill., to Oakland, Cal.	141.18
Oct.	23, Foster & Parker, Printing and shipping Treasurer's Report	73.25
Oct.	23, E. Burrell, For typing College Committee's Report.....	44.15
Oct.	23, Dr. J. D. Fair, Expense as Resident Secretary of Ohio...	7.25
Oct.	23, Dr. Arthur Hughes, Veterinary History Committee of the A. V. M. A.....	3.28
Oct.	23, Chauncey Halt Co., For 1000-16 pp. Constitution and By-Laws	33.00
Oct.	23, Dr. P. A. Fish, Expenses in connection with new Journal	15.65
Oct.	23, Dr. C. J. Marshall, Travelling expense in connection with new Journal	5.60
Oct.	23, Alma Ostrom, Clerical services to Secretary of A.V.M.A.	10.00
Oct.	23, A. J. Tupa, Stenographic services for College Committee Report	26.51
Oct.	23, Juster & Baird, Premium on bond of C. M. Haring, Sec'y	8.75
Oct.	23, Dr. Richard Lyman, Travelling expenses in connection with new Journal.....	48.98
Oct.	23, Chas. P. McLafferty, Printing and stationery.....	40.30
Oct.	23, A. Carlisle & Co., Stationery and office supplies for Sec'y's Office	11.70
Nov.	13, Dr. A. Eichhorn, Expense in connection with sub-committee on Journal.....	18.62
Nov.	13, Multigraph Letter Co., Multigraphing letters	3.41
Nov.	13, Dr. P. A. Fish, Salary as Editor of Journal of A.V.M.A.	100.00
Nov.	13, Dr. C. M. Haring, Acct. of salary as Sec'y of A.V.M.A.	100.00
Nov.	13, United States Fidelity & Guaranty Co., Premium F. H. Schneider's bond	2.50
Nov.	13, Wm. F. Murphy's Sons Co., Office supplies for Treasurer	6.80
Nov.	13, Sun Printing House, Printing stationery.....	8.00
Nov.	13, Miss Bertha C. Spencer, Time and services reporting convention of A.V.M.A.	245.15
Dec.	4, The Multigraph Letter Co., Multigraphing letters.....	2.85
Dec.	4, The O'Donnell Printing Co., Printing.....	30.00
Dec.	4, The Multigraph Letter Co., Multigraphing letters.....	2.85
Dec.	4, John W. Spence, Stationery for Executive Committee..	10.00
Dec.	4, Dr. P. A. Fish, Freight on Reviews for October and back numbers	10.43
Dec.	4, Dr. P. A. Fish, Clerical work, typewriting and book-keeping	37.20
Dec.	4, Dr. P. A. Fish, Acct. salary as Editor of Journal of A. V.M.A.	100.00
Dec.	21, Norton Printing Co., Printing November Journal and letter-heads	478.43
Dec.	21, Cornell Co-Operative Society, Office supplies furnished the Journal of A.V.M.A. for use by Dr. Fish.....	29.15
Dec.	21, Dr. P. A. Fish, Expenses and telegrams.....	4.99
Dec.	21, Dr. P. A. Fish, To cash advance of \$300.00 to use as revolving fund, as per action of Executive Committee 12-1-15	300.00
Dec.	21, Dr. David E. Buckingham, Advance to be used by Legislative Committee	100.00

1915.

Dec. 29,	Dr. J. J. Kerr, Membership and Dues returned—Application received too late for action.....	8.00
Dec. 29,	Dr. W. H. Lynch, Membership Fee and Dues returned...	8.00
Dec. 29,	H. E. Hosbach, Clerical work and auditing Treasurer's books.....	5.00
Dec. 29,	Bertha C. Spencer, Transcribing of proceedings of Veterinary Faculty and Examining Boards of N. A.....	51.00
Dec. 29,	American Veterinary Review, 1890 copies of October issue of Journal at \$8.00 per 100—extra numbers...	151.00
Dec. 29,	E. H. Yunker, Flowers for David McKibbin, Dec.....	10.00
Dec. 29,	Murray J. Brady, Report of Executive Committee Meeting, Dec. 1, 1915, Chicago.....	23.40

1916

Jan. 10,	D. H. Halles, Membership Fee and Dues returned....	8.00
Jan. 10,	A. A. Cuthberton, Membership Fee and Dues returned...	8.00
Jan. 10,	J. MacDonald, Membership Fee and Dues returned....	8.00
Jan. 10,	M. A. Sheman & Sons, Letterheads and envelopes for Committee of Intelligence and Education.....	2.50
Jan. 10,	P. A. Fish, Salary as Editor of Journal.....	100.00
Jan. 30,	C. P. McLafferty, Letterheads and envelopes for Sec'y's Office.....	29.00
Jan. 29,	Chauncey Halt Co., Balance on bill Aug. 1, 1915.....	2.00
Jan. 29,	Dr. C. M. Haring, Acct. salary as Sec'y A.V.M.A.....	100.00
Jan. 29,	The Multigraph Letter Co., Multigraphing letters.....	4.00
Jan. 29,	Joseph Mosher, Membership Fees and Dues returned....	8.00
Jan. 29,	Dr. C. M. Haring, Office expenses of Sec'y from Sept. 4, 1915, to Jan. 14, 1916.....	285.57
Feb. 12,	N. S. Mayo, Expense as Chairman of Committee of Investigation of Vety. Colleges.....	49.55
Feb. 12,	N. C. Netherwood Printing Co., Letterheads and envelopes for Committee on Agricultural Colleges.....	7.25
Feb. 26,	Dr. P. A. Fish, Salary as Editor of Journal of A.V.M.A.....	100.00
Feb. 26,	Lederer, Street & Zlus, Printing application blanks and circulars.....	38.60
Feb. 26,	C. P. McLafferty, Letterheads and engraving.....	48.50
Mar. 3,	Dr. S. H. Ward, Expense visiting Educational Institutions.....	82.32
Mar. 3,	N. S. Mayo, Inspection of Colleges.....	49.34
Mar. 3,	Dr. P. A. Fish, Salary as Editor of Journal A.V.M.A.....	100.00
Mar. 3,	American Veterinary Review, Part Payment for A. V. R.....	500.00
Mar. 10,	Multigraph Letter Co., Multigraphing and addressing..	9.75
Mar. 18,	Dr. Chas. H. Higgins, Postage and stationery.....	13.00
Mar. 18,	Ithaca Realty Co., Premium on bond of Editor Journal A. V. M. A.....	7.50
Mar. 18,	Lederer, Street & Zlus Co., Printing circulars, membership cards, etc.....	144.30
Mar. 18,	Multigraph Letter Co., Multigraphing and addressing...	27.43
Mar. 30,	Dr. C. M. Haring, Office expenses and incidentals as Sec'y	192.33
Mar. 30,	Dr. P. A. Fish, Salary as Editor of Journal of A.V.M.A.....	100.00
Mar. 30,	Dr. J. C. Gibson, Expenses as resident Sec'y Des Moines, Iowa.....	30.00
Mar. 30,	Dr. David E. Buckingham, Expenses in matter of Army Legislation.....	200.00
April 10,	Dr. S. H. Ward, Expense incurred while inspecting Colleges.....	47.29
April 10,	Dr. W. B. Mack, Expense incurred while inspecting San Francisco Veterinary College.....	28.20
April 10,	N. S. Mayo, Expense incurred while inspecting Colleges..	47.27
April 10,	Dr. C. M. Haring, Letterheads, etc.....	5.50

1916.		
April 10,	B. H. Edgington, Expense incurred while inspecting colleges	21.45
April 10,	D. C. Gearhart, Refund of Initiation Fee on acct. of having subscribed to Journal	1.00
April 24,	Dr. A. Eichhorn, Stationery and postage as Sec'y of Committee on Journal	12.50
April 24,	Dr. C. M. Haring, One-fifth of annual salary as Sec'y ..	100.00
April 24,	Dr. P. A. Fish, For revolving fund for Journal of A.V.M.A.	300.00
April 24,	George Hilton, Customs duty on stationery	2.13
April 24,	C. P. McLafferty, Letterheads	43.90
May 4,	Dr. David E. Buckingham, Current expenses of Legislative Committee	200.00
May 4,	Dr. P. A. Fish, Salary as Editor of Journal of A.V.M.A.	100.00
May 4,	Dr. Edw. A. Cahill, Flowers—funeral of Dr. Francis Abele ..	10.00
May 4,	Dr. S. W. Allen, Expenses as resident State Sec'y Watertown, S. Dakota, 1911-12-13-14-15	35.00
May 4,	A. S. Cooley, State Veterinarian, Investigating the Veterinary College at Toronto for Committee on Intelligence and Education	30.74
May 4,	The Multigraphing Letter Co., Multigraphing, etc.	10.75
May 23,	Lederer, Street & Zlus Co., Printing circulars and envelopes	42.05
May 23,	Geo. W. Dunphy, Services and expenses on Committee Inspecting Colleges	27.13
May 23,	G. A. H. Edmuiston, Refund of Initiation Fee	3.00
May 23,	Gladys H. Lent, Multigraphing letters	4.67
May 23,	Lederer, Street & Zlus Co., Envelopes	2.85
May 23,	The North Central Publishing Co., Envelopes	3.25
May 31,	Dr. P. A. Fish, Salary as Editor of Journal of A.V.M.A.	100.00
June 8,	Dr. E. T. Baker, Expense while investigating Washington State College	12.50
June 8,	Dr. H. Preston Hoskins, Postage—(Membership Campaign)	15.00
June 23,	Dr. E. A. Downs, Refund of subscription to Journal on Initiation Fee	3.00
June 23,	Dr. Upton N. Stuart, For overpayment of Application Fee	4.00
June 23,	Dr. Daniel J. Meador, For overpayment of Application Fee	3.00
June 23,	Dr. F. R. Wadsworth, Refund of subscription price of Journal	3.00
July 1,	Dr. C. M. Haring, One-fifth salary as Secretary	100.00
July 1,	Dr. P. A. Fish, Salary as Editor of Journal A.V.M.A.	100.00
July 1,	Dr. P. A. Fish, Revolving fund for Journal A.V.M.A.	300.00
July 1,	Multigraph Letter Co., Multigraphing	32.19
July 1,	Dr. C. D. Turney, Refund of subscription price to Journal ..	3.00
July 22,	Dr. H. K. Moore, Refund of Student subscription price of Journal on Application Fee	2.00
July 22,	American Veterinary Review, On acct. purchase of A.V.M.A.	500.00
July 22,	Dr. P. A. Fish, Revolving fund for Journal of A.V.M.A.	400.00
July 22,	Dr. P. A. Fish, Salary as Editor of Journal of A.V.M.A.	100.00

Total expenditures, 1915-16..... \$ 8,762.37

Total receipts	10,111.43
Total expenditures	8,762.37

Balance in bank \$ 1,349.06

Respectfully submitted,

F. H. SCHNEIDER, *Treasurer.*

American Veterinary Medical Association:

GENTLEMEN:—We certify that the enclosed settlement is correct, balance to your credit this date shows \$1,349.06 as per enclosed book and cancelled checks.

J. F. BAUDER, *Cashier,*

Philadelphia, Pa., Aug. 3, 1916.

The Tenth National Bank.

NEW YORK STATE VETERINARY MEDICAL SOCIETY

The twenty-seventh annual meeting of the New York State Veterinary Medical Society was held at the New York State Veterinary College at Cornell University, Ithaca, N. Y., August 2, 3 and 4. Slightly over one hundred veterinarians and about twenty-five ladies were in attendance.

The meeting was called to order by President Otto Faust of Poughkeepsie. Addresses of welcome were given by Prof. T. F. Crane on behalf of the University and Mr. J. L. Rothschild on the part of the City of Ithaca. These were responded to on behalf of the society by Dr. E. B. Ackerman of Brooklyn.

These addresses were followed by the general business meeting, including the reports of the various committees. Included in the Report of the Prosecution Committee were the following two articles:

"ARTICLE 1. Any member who shall knowingly issue a false report of a tuberculin or other test for tuberculosis of cattle or shall issue a false certificate of soundness upon any domestic animal or shall, with intent to deceive, render a false diagnosis in any case of dangerous contagious disease shall, after a hearing and due proof, be expelled from the society. Should charges under this section be filed with the Board of Censors and such Board should deem the charges of sufficient merit, it shall promptly refer such charges with evidence obtained to the Regents of the University of the State of New York or other authorities for immediate action.

"ARTICLE 2. Any member who shall have in his employ for the purpose of rendering veterinary service, an unlicensed veterinarian as assistant, agent, partner, or in any other capacity whatever, shall be expelled from this society. This section shall not be

construed so as to prevent a licensed veterinarian from employing a bona fide veterinary student fully matriculated in a veterinary college, whose graduates are eligible to take the State Veterinary Examinations, to assist him as a student during the regular vacations of the veterinary college."

It was recommended that these be added to the Code of Ethics. The society voted to present these articles to be incorporated in the By-Laws at the next annual meeting as is laid down by the Constitution.

The Resolutions Committee presented the following which were adopted:

"No. 1. The New York State Veterinary Medical Society assembled at Ithaca, N. Y., August 2, 3, and 4, 1915, regrets the deplorable condition the war has forced upon our brother veterinarians in Europe and resolves herewith to cooperate with the movement instituted by Dr. Liautard of France for their relief and assistance by tendering the financial support of this society to the extent of 107 dollars.

"No. 2. Resolved that it is the sense of this meeting that the emblem of the A. V. M. A. be a plain enameled cross, color to be the same as that designated by the United States Army Veterinarians and the same to have A. V. M. A. in plain black letters across the front.

No. 3. Whereas: Certain practices and conditions recently exposed as existing in the meat inspection service of New York City Department of Health have reflected discredit on the veterinary profession of New York City and New York State, and

Whereas: Only one of the guilty persons involved is a member of the New York State Veterinary Medical Society, and we believe this case will be properly dealt with as soon as the New York City authorities have finished their investigation, as a Society we assume no responsibility for the conduct, therefore be it

Resolved: That this society recommend to the proper authorities of the Health Department and the city administration of the City of New York that salaries paid veterinary inspectors be commensurate with their duties, thereby insuring better service. And further, be it

Resolved: That a copy of this resolution be submitted to the Health Commissioner.

"No. 4. Inasmuch as practical knowledge, scientific investigation and research has proven that the spread of tuberculosis and contagious abortion, together with its allied diseases is being extensively disseminated through the dairy and breeding herds throughout the state, due to the feeding of raw skim milk and whey from public milk plants, cheese and butter factories, and

Whereas: A special commission appointed by Ex-Governor Glynn prepared a very complete and exhaustive report setting forth practical and efficient methods of procedure to remedy these undesirable conditions through the universal and efficient pasteurization of these by-products, and

Whereas: This society believes this procedure to be an important and effective means of preventing the spread of these diseases to hogs, calves and young stock, therefore be it

Resolved: That this society requests the Commissioner of Agriculture to do everything in his power to bring about such desirable legislation at the next session of the Legislature, and furthermore be it

Resolved: That a copy of this resolution be transmitted to the Commissioner of Agriculture and the chairmen of the committees on Agriculture in the Senate and Assembly at the next session of the Legislature."

The program of papers was printed in the last number of the JOURNAL and was carried out as given. The discussion was excellent and much valuable information was thereby brought out. The papers will be printed in the Proceedings of this society.

The officers elected for the coming year were as follows:

President, J. G. Wills, Department of Agriculture, Albany, N. Y.; Vice-President, Geo. A. Knapp, Millbrook; Secretary-Treasurer, C. P. Fitch, Ithaca; Librarian, W. L. Williams, Ithaca.

Board of Censors: W. G. Hollingworth, Utica; Henry Cady, Gloversville; J. McCartney, Middletown; R. S. MacKellar, New York; C. S. Chase, Bay Shore.

It was voted to hold the next meeting in Brooklyn.

C. P. FITCH, Secy.

PRESIDENT'S ADDRESS*

OTTO FAUST, Poughkeepsie, N. Y.

Members of the New York State Veterinary Medical Society:

I take this opportunity to express to you my gratefulness for the honor you have conferred upon me by electing me president of this society.

This honor I have tried to appreciate by giving my best efforts for the welfare of the society and veterinarians of the state.

In compliance with Section 1, Article 1 of the By-Laws, I submit the following communication:

DISEASES: *Foot-and-Mouth Disease.* This disease has been successfully controlled in this state at a cost of \$275,000.00, the last outbreak occurring on August 10th, 1915. The Department of Agriculture should be congratulated on the efficient work it has accomplished.

Rabies, anthrax, blackleg and hog cholera are being held in subjection.

Contagious abortion. This disease is of great importance to the veterinarians and cattle breeders of this state, and I am sorry to report to you that we are still in the dark as to its control, but in the near future, through the work now being carried on by special investigations under the supervision of Dr. W. L. Williams, we hope to receive a more favorable report.

Tuberculosis: According to the statistics compiled by the Department of Agriculture this disease has been gradually lessening; in the year 1909-1910, 21% of the cattle examined by the state were condemned, while in the year 1914-1915, 11% were condemned, also the first half of the fiscal year ending April 1st, 1916, showed about 11% condemned of those examined, showing a decided decline from 21% to 11% in five years.

The following is a report in full from the Department of Agriculture:

*Presented at the meeting of the New York State Veterinary Medical Society, Ithaca, N. Y., August 2, 1916.

BOVINE TUBERCULOSIS.

	Fiscal Year 1909-10	Fiscal Year 1910-11	Fiscal Year 1911-12	Fiscal Year 1912-13	Fiscal Year 1913-14	Fiscal Year 1914-15	First Half Fiscal Year 1915-16
No. of cattle examined by the State	14,181	17,909	21,421	18,668	18,284	17,292	14,830
No. of cattle condemned at such examinations 3,029-21%		2,993-16%	4,178-19%	2,891-15%	2,139-11%	1,916-11%	1,744-12%
Results of Post Mortem							
{ No. of cases of localized tuberculosis.....	1,685	2,069	2,690	1,949	1,409	1,277	1,157
{ No. of cases of general-ized tuberculosis	1,240	824	1,117	581	424	401	330
{ No. of "No Lesion" cases (no disease found)	104-3%	100-3%	93-2%	85-2%	70-3%	80-4%	83-4%
No. of cattle examined privately (at owner's expense) no record.....	No Record	5,993	12,038	20,545	23,815	21,863	
No. of cattle rejected at such examination.....	" "	425	473	528	896	728	
Total No. of cattle examined	" "	23,902	33,459	39,213	42,099	39,155	
Total No. of cattle rejected	" "	3,418-14%	4,651-13%	3,419-8%	3,035-7%	2,645-6-7%	

GLANDERS.—From the report of the Department of Agriculture we find that the number of clinical cases has been reduced, in 1909-10-83% of the cases condemned were clinical cases, and in 1914-1915-25% were clinical cases.

The following is a report in full from the Department of Agriculture:

GLANDERS.

	Fiscal Year 1909-10	Fiscal Year 1910-11	Fiscal Year 1911-12	Fiscal Year 1912-13	Fiscal Year 1913-14	Fiscal Year 1914-15	First Half Fiscal Year 1915-16
No. of horses and other equine animals condemned because of Glanders.....	743	1,401	1,631	1,640	1,608	1,198	444
Results of Post Mortem							
{ No. of cases of Clinical Glanders	618-83%	1,140-81%	1,294-79%	1,217-74%	677-42%	305-25%	133-29%
{ No. of cases of non-clin- ical Glanders	125	258	329	419	927	890	308
{ No. of "No Lesion" cases (no disease found) .....	.....	3	8	4	4	3	3

CHARLES S. WILSON, Commissioner,
J. G. WILLS, Chief Veterinarian.

LEGISLATION: On account of the new annual registration law passed last year, we have had considerable trouble with our legislation.

We have for years depended upon our Educational Department to assist us in keeping up our professional standing, but for some reason which does not seem clear at this time the so-called McNab bill which allows registration without examination under certain conditions was supported by that department. I believe I express the sentiment of a majority of our profession in stating that such legislation is retrogressive rather than progressive. There seems to be some doubt as to the constitutionality of such a law.

Most of you know of the effort made to defeat this and other objectionable bills, but we were unable to make our opposition felt as strongly as it should have been because of lack of early information on these bills.

This society should employ one of the agencies at Albany to furnish the chairman of the legislative committee a copy of every bill as soon as introduced having any bearing on veterinary medicine.

Laws favorable to the profession have been passed such as the Halliday bill, appropriating \$15,000.00 for special investigation of contagious abortion, and the Wilson bill, providing for the licensing of stallions.

As you know, the prosecution of illegal practitioners is through the channel of the Attorney-General's office, but from the experience of the year just passed very little will be accomplished unless the society takes a decided stand. It is evident that it cannot accomplish the desired results unless the profession renders every possible aid.

I do not wish to go into details, but will tell you that the committee on prosecution have a communication which they will present and I hope that you will give it your earnest consideration.

SOCIETIES: We have in this state six local veterinary societies. From the reports received and from my personal observation of those that I had the pleasure of visiting, convinces me that they are a great benefit not alone from an educational standpoint, but they also promote sociability among our practitioners which has been somewhat neglected in past years.

The conference given by the Veterinary Department of the New York State Veterinary College at Ithaca on January 11 and

12th, 1916, was one long to be remembered. The Faculty and Student Welfare Club are to be congratulated for their successful educational and social conference.

Our state society has a membership of 177, which is a slight increase over last year, but when we take into consideration that there are nearly 700 veterinarians who are eligible to become members, it seems to me that something should be done. I would recommend that the president appoint county secretaries to make a special effort to increase our membership.

The State Breeders' Association and the State Dairymen's Association should be of more interest to the profession as the results to be obtained are of mutual interest to all and by our attendance at their meetings show them that we are interested in their work. With the breeders, dairymen and veterinarians united for the one object, the improvement of our live stock, we should be a power in this state.

I wish to thank the officers and members for their able assistance given me during the past year.

OKLAHOMA GRADUATE VETERINARY MEDICAL ASSOCIATION

The Meeting of the O. G. V. M. A., July 18-19, resulted in the coalescing of the two graduate veterinary associations of this state with the election of the following officers for the new association: R. Fred Eagle, Pres.; Joseph E. Nance, Vice-Pres.; C. C. Hooker, Treas.; and R. C. Smith, Secy.

The name of the new organization is the Oklahoma State Veterinary Medical Association. It starts out with a membership of about seventy-five.

R. C. SMITH, Secy.

CONNECTICUT VETERINARY MEDICAL ASSOCIATION

The semi-annual meeting of the Connecticut Veterinary Medical Association was held at the hospital of Dr. E. F. Schofield at Greenwich, Conn., on Tuesday, July 25th.

There were thirty-eight members and visitors in attendance at the time of the clambake, which was served at about two P. M. and was apparently greatly enjoyed by all.

Dr. Schofield's establishment is situated in the midst of a beautiful city park and its surroundings were highly conducive

to the enjoyment of those present. The day was devoted to the reading of papers and discussions and to clinics.

At its business meeting the association voted to go on record as being in favor of the adoption of the blue cross, as the national Veterinary Emblem and directed the treasurer to draw a check for fifty dollars as the C.V.M.A.'s contribution to the Salmon Memorial fund.

A. T. GILYARD, Secretary.

WISCONSIN VETERINARY MEDICAL ASSOCIATION

The semi-annual meeting of the Wisconsin Veterinary Medical Association was held at Menomonie, Wis., July 26-27, 1916.

When President L. J. O'Reilley sounded the gavel on the morning of July 26th, in the Chamber of Commerce Parlors, he called to order one of the largest and most instructive meetings our association ever held. The forenoon of the first day was taken up by a general business session, and the reports of several standing and special committees.

The program which was carried out in full for the balance of the meeting consisted of the reading and discussion of the following papers:

Torsion of the Uterus in the Mare, Cow, and Sheep.....

.....Ed. Boesewetter

Necroforus Infection in Colts.....O. A. Rabe

Dourine (Maladie du coit).....S. H. Ward

State Veterinarian of Minnesota

AzoturiaH. Gutschenritter

The Bull as a Disseminator of Contagious Abortion.....

.....F. B. Hadley and H. Lothe

An Indication Signified by Bowel Palpation.....

.....J. W. Beckwith

An Interesting Case Report on Sterility in a Stallion....

.....C. W. Brown

Paresis in Swine due to Constipation.....A. E. Fabian

A question box, creating a prolonged discussion on questions of vital importance.

We were exceedingly fortunate in having Drs. C. E. Cotton and S. H. Ward of Minnesota with us. The part they took in our program and in the general discussions was greatly enjoyed by all

present. To show their appreciation, the association elected them to Honorary Fellowship in our Society.

One half day of the session was given over to a clinic which was arranged for by Dr. J. D. Lee, and held at his infirmary. The amount of material and kind of subjects selected surely did credit to Dr. Lee and his assistants. Out of the ordinary was a stock judging demonstration by Prof. Pickford of the College of Agriculture.

The meeting was closed on the afternoon of July 27th, with a short business session, at which time the association passed a resolution setting permanent dates for our annual and semi-annual meetings for the third week in January and July of each year.

With many thanks to the citizens of Menominee and Dr. J. D. Lee for courtesies rendered the meeting closed with a smoker tendered by the Chamber of Commerce on the evening of July 27th.

Adjournment was taken to meet at Madison, January 16, 17 and 18th, 1917.

W. A. WOLCOTT, Secretary.

MISSOURI VALLEY VETERINARY ASSOCIATION

The Missouri Valley Veterinary Association held its 22d annual meeting at Omaha, Nebraska, July 10, 11 and 12. The meeting was well attended and was in every way a success.

In the absence of Mayor Dahlman the address of welcome was made by City Attorney Tepole. Dr. R. C. Moore, one of the three charter members present, responded to this address, briefly reviewing the work of the association and calling attention to present conditions as they pertain to veterinary progress.

Some very interesting reports and papers were read and valuable discussions were elicited. Among the newer ideas introduced might be mentioned Dr. Bemis' method of producing local anaesthesia for equine dental operations. This consists of injections of cocaine or similar agents along the course of the maxillary and mandibular nerves near the points where they enter their respective foramina in the jaw bones. Another comparatively new procedure introduced was the immunization of cattle against blackleg by simultaneous vaccination with virus and hyperimmune serum. This has been worked out by the Veterinary Department of the Kansas State Agricultural College and was presented to the association in a paper by Dr. F. S. Schoenleber.

A splendid paper entitled "Important Essentials in Profitable Horse Production" was read by Dr. C. W. McCampbell, Secretary of the Kansas Livestock Registry Board. He pointed out that it is costing American farmers more to rear the average colt than the animal is worth upon reaching a marketable age; he showed that a colt from a grade stallion is worth about half what a colt from a pure bred sire is worth, both from the same dam and reared under like conditions. His plea was for a higher standard in our breeding stock, particularly in stallions.

Other papers of merit were read by Drs. J. I. Gibson, S. W. Alford, Henry Hell, E. A. Logan, C. F. Nord, E. L. Quitman, N. S. Mayo, C. J. Norden, W. W. Dimock and C. A. Langenfeldt.

The clinic, which was held on the second day, was unusually well attended and a very full program was provided by members of the local committee. A young sow with eversion of the vagina was operated on by Dr. Shipley. This case was interesting because it was one of a herd of forty or more, nearly all similarly affected. Several members reported the sporadic appearance of this condition in their respective localities. It seems to be not hereditary or due to any anatomical deficiency, but rather to some form of dietary intoxication. Dr. E. L. Quitman, assisted by Dr. D. M. Campbell, demonstrated a new method of inducing anaesthesia in dogs.

Initiation into the Ak-Sar-Ben, the unique booster organization of Omaha business men, and a banquet at the Hotel Castle were the most notable features of the social program.

Resolutions of condolence to the relatives of deceased members were adopted. Other resolutions proposed and adopted are as follows:

RECOGNITION OF THE FINAL ERADICATION OF FOOT-AND-MOUTH DISEASE FROM THE UNITED STATES. *Whereas* the livestock industry was severely affected by the recent outbreak of foot-and-mouth disease;

Whereas the disease has been successfully eradicated by the Bureau of Animal Industry through cooperation with the various states concerned;

Whereas the work was successfully consummated with a limited loss of livestock considering the extent of the outbreak and at a less expenditure of money than in any similar outbreak on record;

Therefore be it resolved that this association express its grati-

fication and confidence in the ability of the veterinarians taking part in this work;

And be it further resolved that this association further appreciates the cooperation of the livestock interests which facilitated the prompt eradication of the disease;

And be it further resolved that a copy of these resolutions be forwarded to the Secretary of Agriculture, U. S. A.

PASSAGE OF THE ARMY BILL. *Whereas* the Congress of the United States has seen fit to recognize the importance of the army veterinary service by commissioning the army veterinarians;

Whereas the Honorable James Hay and Dr. W. Horace Hoskins, many Senators, other Representatives, veterinarians and members of the army legislative committee, devoted much time and energy in support of this bill to its successful passage;

Therefore be it resolved that this association express its appreciation of this recognition;

And be it further resolved that this association express its appreciation to the various parties for their services to the army veterinary corps and the profession at large.

HOG CHOLERA CONTROL WORK. *Whereas* hog cholera is a serious and widespread disease and has for the last few years caused serious losses. However, through the untiring efforts of the veterinary profession, it has been kept under control with diminished losses;

Whereas the veterinarian alone is especially fitted by virtue of his education and training to cope with the prevention and treatment of hog cholera;

Whereas there is considerable agitation to transfer government hog cholera control work from the Bureau of Animal Industry to another department.

Whereas the Bureau of Animal Industry through cooperation with the various state organizations and veterinary practitioners has successfully eradicated pleuropneumonia and foot-and-mouth disease from our country and has materially diminished the scabies and tick infested areas and has made material progress in the control of hog cholera, thus demonstrating its efficiency;

Therefore be it resolved that this association express its confidence in the Bureau of Animal Industry and urge the Secretary of Agriculture to use his influence for the continuation of hog cholera control work by the Bureau of Animal Industry;

Be it further resolved that a copy of this resolution be sent to the Secretary of Agriculture, U. S. A.

Be it resolved that this association commends all the good work accomplished by the county agricultural agent movement, and especially in those instances where the county agents have cooperated with the local veterinarians;

Be it further resolved that this association deplores the fact that in some instances county agricultural agents have assumed to render services that only qualified veterinarians are prepared to do. Therefore, we urge that the Secretary of Agriculture issue instructions to all county agents to refrain from treating diseases of livestock unless such agents are qualified veterinarians;

Be it further resolved that a copy of this resolution be sent to the Secretary of Agriculture, U. S. A.

Whereas the American Veterinary Medical Association has not held a meeting in the Missouri Valley since 1907;

Whereas the number of veterinarians has increased materially since 1907 and the profession is benefitted by such an association meeting in its territory;

Therefore be it resolved that an invitation be extended to the American Veterinary Medical Association to convene at Kansas City in 1917.

Be it resolved that we sincerely thank the retiring officers and committees for their successful efforts in the carrying out of their various duties;

Be it further resolved that we express as an association our appreciation of the very excellent way in which the local committee on arrangements has provided for the meeting and extend to its members our thanks for their thoughtfulness for our welfare and entertainment.

Officers for the ensuing year are: President, R. C. Moore, St. Joseph; Vice-President, C. C. Hall, Omaha; Secretary-Treasurer, R. F. Bourne, Kansas City.

Trustees: H. R. Morris, Omaha; D. H. Miller, Council Bluffs; Joseph Hughes, Chicago; J. H. Scott, Princeton, Mo.; B. W. Conrad, Sabetha, Kans.

R. F. BOURNE, Secretary.

TENNESSEE VETERINARY MEDICAL ASSOCIATION**OFFICERS, 1916**

President, Dr. J. H. McMahon, Columbia, Tenn.; Vice-President, Dr. E. M. Culley, Paris, Tenn.; 2nd Vice-President, Dr. G. P. Whittington, Morristown, Tenn.; Secretary, Dr. F. W. Morgan, Chattanooga, Tenn.; Treasurer, Dr. W. P. Coplin, Humboldt, Tenn.

Executive Committee: F. R. Youree, S. H. Woods, J. W. Scheibler.

Legislative Committee: M. Jacob, P. J. Landes, A. C. Topmiller.

Finance Committee: Wm. Murray, J. J. Gregory, Jas. M. Jones.

Resolutions Committee: Geo. R. White, C. E. Kord, G. B. Blackman.

Ethics Committee: Geo. R. White, F. W. Morgan, G. B. Giltner.

The annual mid-summer meeting of the Illinois State Veterinary Medical Association was held at Peoria, Ill., July 19. Among those on the program were Doctors Dyson, LaCroix, A. H. Baker and Mayo. At the clinic held at the veterinary hospital of Doctors Scott & Brown, numerous demonstrations and surgical operations were performed by Dr. L. A. Merillat. It is said that more than 250 were in attendance.

The next meeting of the California State Veterinary Medical Association will be held in San Francisco Sept. 13.

The semi-annual meeting of the Oklahoma Graduate veterinary Medical Association was held July 19. After committees had been appointed, the visitors were treated to an automobile ride, a trip through the Sulzberger plant and the serum laboratories at Packingtontown.

The marriage of Miss Julia Swan and Dr. D. W. Hurst occurred July 20. Dr. Hurst is a graduate of the Ames, Ia. Veterinary College and is in the employ of the government in connection with hog-cholera work. They will establish their home at Tecumseh, Nebraska after August 15.

REVIEWS

DISEASES OF THE DOG AND THEIR TREATMENT

DR. GEORGE MÜLLER

Professor Director of the Clinic for Small Animals at the Veterinary
High School at Dresden and

ALEXANDER GLASS, A.M., V.S. (McGill)

Professor of Canine Medicine in the Veterinary Department
University of Pennsylvania

Fourth illustrated edition, revised and enlarged. Alexander Eger, Publisher,
Chicago, 1916.

The fourth edition of this book has just come from the press, and shows some important changes. The most notable of which are to be found in the chapter on Infectious Diseases, which contains considerable new material on canine distemper, and a discussion of Infectious Hemorrhagic Gastro-enteritis. These two diseases are of great importance to the veterinarian, and dog fancier, hence, a timely revision of this chapter. These diseases are handled according to the present day knowledge of vaccines and serum-therapy.

The chapter discussing the diseases of the digestive system has been re-written, and particularly, that portion dealing with intestinal parasites has been remodelled, and enlarged, so as to include the latest investigations along this line. This subject has been presented in a comprehensive manner so that it will be of inestimable value to both the student and practitioner. Several new things have been added to this chapter, which greatly increase its value over the third edition.

A number of new illustrations have been added to this edition, which will make the book more interesting and valuable, especially to the student.

The author is to be commended for his efforts in bringing forth this revision of such a valuable treatise on the Diseases of the Dog.

The book as a whole is well bound, is neat in appearance, and should be well received by the student and practitioner of veterinary medicine.

O. V. B.—J. N. S.

A LABORATORY MANUAL IN GENERAL BACTERIOLOGY

WARD GILTNER

Prepared by the Laboratory of Bacteriology, Hygiene and Pathology, Michigan Agricultural College, Ward Giltner, Head of the Department. Pp. XVI, 418. Published by John Wiley and Sons, Inc., New York. Price \$2.50.

As the title indicates, this volume is a laboratory manual in general microbiology. It is the outgrowth of experience in teaching this subject in the Michigan Agricultural College and in its preparation a number of those who have been engaged in the Department of Bacteriology in that institution have taken more or less part. The book is divided into three parts. Part one consists of 53 exercises on general morphological and cultural methods; part two contains 33 exercises on the physiology of microorganisms; part three pertains to applied microbiology and is made up of exercises on the following topics: air microbiology, water and sewage microbiology; soil, dairy, and plant microbiology, animal diseases and immunity. These are followed by an appendix giving an outline for the study of microorganisms, a table for the identification of bacteria and the examination of polluted waters, and directions for the preparation of special culture media, various formulae and other topics of general interest.

As suggested in the title, this book covers a large number of subjects. It is impossible to discuss extensively such a variety of topics fully in the space that can be allotted in a laboratory manual. The text contains 74 illustrations, nearly all of which are excellent and well chosen. It is natural that in the choice of subject matter and in the methods recommended, differences of opinion exist. There are, however, very few changes or additions that suggest themselves. The author seems to have chosen wisely and it is doubtful if an aggregate of 100 exercises could be selected that would be more helpful to the student of general microbiology than those outlined in this volume. The author is to be congratulated in his choice of topics and the clearness with which he has outlined them for the help of the student. These directions can be highly recommended to those who desire to study general bacteriology, including certain of the higher forms. At the end there is a valuable list of text and reference books. The publishers have done their part most satisfactorily.

V. A. M.

OUTLINE OF LECTURES IN SPECIAL PATHOLOGY

SAMUEL HOWARD BURNETT

Professor of Comparative Pathology in the New York State Veterinary College at Cornell University, Ithaca, N. Y. Carpenter and Company, Ithaca, 1916. Pp. 64.

The teaching of special pathology or the structural changes, including the changes in function, of the several organs and parts of the body is a somewhat difficult task. It is, however, exceedingly important that the student of veterinary medicine should have as clear and definite a knowledge of the various changes that may take place in the different organs and structures of the bodies as possible. It is these changes that the practitioner has to take into account in formulating a successful method of treatment. In the teaching of pathology it has been found desirable to divide the subject into three parts, namely, general pathology, special pathology and the pathology of the specific infectious diseases. The first gives the causes and explains what the structural changes are. The second deals with the diseases that affect the different organs. The first two make it possible to differentiate from changes due to general causes, the lesions peculiar to invasion of the body by specific etiological factors.

For some years the author of this book has given a course of lectures, supplemented with laboratory exercises, on special pathology. These lectures are devoted to the cardio-vascular system, respiratory system, digestive system, urinary system and the skin. Under each of these general headings is a carefully arranged synopsis of the changes that may take place in each organ and membrane. A list of the more important text and reference books on comparative pathology is appended.

The purpose of this synopsis is to enable the student to follow the subject and to be able to select from the enormous literature the topics that are of the most importance. This synopsis indicates, in a logical manner, the tissue changes that are known to occur in each organ and tissue. While this volume was prepared primarily for students taking their lectures on special pathology, it would be very helpful to any person who wishes to study the subject. As the author is among the best comparative pathologists and a good teacher, the work embodies both the facts based on scientific research and the perspective of the teacher.

V. A. M.

NECROLOGY

S. M. SMITH

Dr. S. M. Smith of Mitchell, South Dakota died very suddenly of acute indigestion on the 23d of last March.

CHARLES BEECHER POTTER

Dr. C. B. Potter, aged 43, died suddenly of heart trouble at his home at Ithaca, N. Y. He was a graduate of the N. Y. State Veterinary College in the class of 1899, and served for a time as U. S. Veterinary Inspector at Chicago, Ill.

ROMANZO PERKINS

Dr. Romanzo Perkins, aged 71 years, died March 15 at his home at Warsaw, N. Y. Dr. Perkins had been in poor health of late years which resulted in a general break down.

EDWIN J. PECK

Dr. Peck died in August at Cleveland, Ohio from typhoid fever. Dr. Peck was a graduate of the Ontario and McKillip Veterinary Colleges. He was stationed at Cleveland as an U. S. Veterinary Inspector.

THOMAS GREGOR BRODIE

Dr. Brodie died suddenly in London, England, August 20. He has been Professor of Physiology at the Ontario Veterinary College at Toronto since 1908. Previous to that he had been Professor in the Royal Veterinary College in London for a number of years. He was one of the foremost physiologists and devoted much of his time to research. At the time of his death he was serving as a captain in the Canadian Army Medical Corps.

E. LAVALARD

Dr. E. Lavalard, an honorary member of the American Veterinary Medical Association, died at Paris, France, May 29, 1916.

MISCELLANEOUS

Dr. H. E. Lent, formerly of Sauk Center, Minn., has removed to Akeley, Minn.

The death of Dr. J. B. Powell of Pueblo, Colorado is reported.

Dr. Julius Stotchik has taken a position with the Horse Aid Society of New York City.

Dr. George L. Schaefer was seriously injured in a motor accident near Omaha, Neb. He is reported to have sustained a broken arm, a broken leg and other injuries.

Dr. Elinor McGrath of Chicago has the distinction of being the first woman veterinarian elected to membership in the American Veterinary Medical Association.

The twentieth annual meeting of the United States Live Stock Sanitary Association will be held at Chicago, December 5, 6 and 7.

Dr. Hoskins reports an increase of \$700 in contributions to the Salmon Memorial Fund.

Dr. C. A. Fast has removed from Haviland, Ohio, to Van Wert, Ohio.

Dr. Carl W. Gay, for a number of years head of the Department of Animal Husbandry at the Veterinary College at the University of Pennsylvania, has resigned to take a position at the University of Minnesota. Dr. Gay was active in procuring the law regulating the registration of stallions. He is the author of two recent books on Animal Husbandry and is regarded as an authority in his department.

Dr. William V. Lusk, Veterinarian of the 2nd Cavalry has been transferred from Fort Ethan Allen, Vt. to Fort Riley, Kansas.

Dr. E. Perroncito, Professor of Bacteriology at the University of Turin, Italy, and an honorary member of the A.V.M.A., has been elected foreign member of the Paris Academy of Medicine.

An outbreak of anthrax has been reported near Hartford, Conn.

Dr. M. E. Dennington has located at 20 Charlotte St., Baldwinville, N. Y.

Dr. M. L. Plumer has removed from Branchville, N. J. to 206 So. 36th St., Philadelphia, Pa.

Dr. M. F. Barnes, formerly of the North Dakota Agricultural College, has removed to 11th and Buffalo Sts., Franklin, Pa.

Dr. W. E. Stribling has removed from New England, N. D. to Clarence, Ia.

Dr. H. Preston Hoskins has severed his connection with the University of Minnesota to take a position in the Research Laboratories of Parke, Davis & Co., at Detroit, Mich.

In the speech of the Hon. William Hughes of New Jersey in the United States Senate, the following remarks were made relative to the Army Veterinarian:

"It has been stated that there is a tendency to bestow rank on men who are civilians and men who constitute no part of the fighting forces. Yet in the present war the Austro-German forces have lost by death 247 veterinary officers. The German Army is not a social organization; and it has clothed these men with rank and authority higher than that sought to be bestowed under this amendment. They rank from colonel, lieutenant colonel, and major on down to second lieutenants. The British Army has done the same thing, as has also the French Army. The Australian and Canadian Armies—in fact, every one of the armies fighting now on the battle fields of Europe—have recognized the important service that can be, and ought to be, discharged by men doing this work.*****

Before I close and submit this matter to the Senate, I desire to read a marginal note that was placed by the Kaiser on the bill reorganizing the German veterinary service, which sets out much better than I can do the regard in which these men are held in the countries where fighting is a profession:

Upon the veterinary officer devolve high moral, physical, and technical demands in peace and war. Only such young men are to be selected for the military veterinary career who possess a high mind, tact, mental versatility, physical activity, and pride in their profession.

A HORSE'S EPITAPH

Soft lies the turf on those who find their rest
Beneath our common mother's ample breast,
Unstained by meanness, avarice, or pride;
They never cheated, and they never lied.
They ne'er intrigued a rival to displace;
They ran, but never betted on the race;
Content with harmless sport and simple food,
Boundless in faith and love and gratitude;
Happy the man, if there be any such,
Of whom his epitaph can say as much.

LORD SHERBROOKE.





